Home Computing WEEKLY

An Argus Specialist Publication

August 23-29, 1983 No. 25

38p

Type in our great game for the TI-99/4A . . . and have fun — page 13

Cricket scoreboard program for the Spectrum — page 25

More programs for VIC-20, Commodore 64, Spectrum

Programming advice for Atari and Oric

1¼m more micros, says new report

Another 1¼m people will own home computers by the end of the year — most of them male and aged 15-44.

The figures are from a new survey which estimates that computers worth £216m will be sold along with £30m-worth of peripherals and software sales of £54m.

Commenting on the age of computer users, Mintel says: "This reflects the higher level of familiarity with new technology among the youngest age bands and the disposable income in the 30s to 40s age band.

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Micro games by cable next year

Games are to be sent by cable to home computer users.

W.H. Smith says its service will start next year and subscribers would choose from 20 games.

Each month some would be deleted and more added.

It will be the first service offered by the company's newly-formed cable services division, planned to serve cable and

Continued on page 5

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Cover picture of Linda Lusardi by Colin Ramsey

Have fun with our TI-99/4A program. It starts on page 13

Let your computer teach you to play the guitar — read the review on page 23

You've seen the TV series and the films — now read the program review of Star Trek on page 43

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SOFTWARE SUPERMARKET

Learn how to mix cocktails, with the program reviewed on page 23

Scroll the flip with Atari — see page 29

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1¼m micros

Continued from front page

"This is further endorsed by the highest ownership level being in the AB socio-economic groupings (middle class), decreasing progressively down the groupings."

But it points out: "Over half the adult population has no desire to buy a home computer.

"This rating is highest among women (64 per cent). The rating grows from 38 per cent of teenagers to 80 per cent of those over 65 and from 38 per cent of the AB grouping to 70 per cent of the E grouping.

"The consumer research, therefore, suggests a potential market for home computers of over 3½m units.

"The 'very high desire to buy' segment of this demand will account for about 1½m of these units. This group is likely to respond to its desire sooner rather than later."

Last year, Mintel says, 356,000 home computers — worth £664m at retail prices — were sold. Software worth £160m and peripherals valued at £100m were also purchased.

Half the sales of computers were in the Christmas shopping period. And for each month sales broke down into 72 per cent hardware, peripherals 10 per cent and software 18 per cent.

The exception was January when, following Christmas computer buying, software sales doubled their proportion.

Mintel finds price cutting in high street shops "a strange aspect" and says: "This may be to attract market share or to destock in anticipation of new product replacing those currently available."

It expects this trend to continue into the second half of the 80s with the rate of fall easing. Prices could drop by up to 15 per cent a year.

And Mintel says high street multiples may well bring out their "own brand" computers.

It says, however, that multiple retailers were not looked on favourably because busy shops made service difficult, after-sales care was poor and training had been inadequate.

Specialist computer chains had been strengthening their position by providing trained staff, technicians and engineers on hand and other facilities for buyers.

Mintel sees specialist chains like Laskys as a growing and ever more significant element but mail order is estimated to fall to 12 per cent from last year's 17 per cent.

Estimates of the share of trade this year (last year in brackets) give W.H. Smith 18 per cent (17), Tandy 12 (12), Laskys 5 (3), Spectrum 8 (5), Currys/Micro C 7 (4), Greens 4 (5), Dixons 2 (3), Boots 2 (2).

Mintel's report, Home Computers, also goes into detail about other aspects of the market. It costs £95.

Mintel, 7 Arundel Street, London WC2R 3DR

	percentage who would like to own a home computer	percentage of those would like to own who have a high desire to purchase
All	17	40
Men	24	45
Women	12	33
15-19	37	50
20-24	28	40
25-34	25	25
35-44	23	55
Social group		
AB	32	40
CI	26	50
C2	15	40
D	10	30
E	11	30

Home computer potential purchasers. Source: British Market Research Bureau/Mintel

	units %	value %
Sinclair	68	40
Commodore	11	18
Acorn BBC Micro	4	8
Atari	4	6
Dragon 32	4	4
Other	9	24

Home computer sales in 1982. Source: Mintel estimates

Cable games

Continued from front page

satellite TV and headed by 37-year-old Francis Baron.

W.H. Smith has signed a deal with The Games Network, of Los Angeles, to distribute its services in the UK and Eire.

It says that The Games Network has a large and growing library of games — about 25 per cent educational — and suitable for all ages.

Although at the start the programs would come from America, there were plans to develop new games in Britain for distribution here and around the world.

W.H. Smith's chairman Simon Hornby said: "Although we decided, after a great deal of research, not to join a consortium for investment in the actual cable operations, we have been keeping a close watch for opportunities in this field.

"The Games Network will be our first step into providing cable services, and we are setting up this new Cable Services Division as we plan to introduce other services for cable operators."

W.H. Smith says it believes The Games Network will increase the overall market for computer games.

The Games Network will be seen in operation for the first time in Britain at the Cable and Satellite Television '83 Show at the National Exhibition Centre, Birmingham, on September 11-14.

You could be on our pages

We welcome programs articles and tips from our readers.

PROGRAMS should, if possible, be computer printed to a width of 48 characters (use a new ribbon) and/or sent on cassette. Check carefully that they are bug-free. Include details of what your program does, how it works, variables you have used and hints on conversion.

ARTICLES on using home computers should be no longer than 2,000 words. Don't worry about your writing ability — just try to keep to the style in HCW. Articles most likely to be published will help our readers make better use of their micros by giving useful ideas, possibly with programming examples. We will convert any sketched illustrations into finished artwork.

TIPS are short articles, and brief programming routines which we can put together with others. Your hints can aid other computer users.

Competitive rates are paid.

Keep a copy of your submissions and include an SAE if you want them returned. Label everything clearly and give a daytime and home phone number if you can.

Paul Liptrot, Home Computing Weekly, 145 Charing Cross Road, London WC2H 0EE

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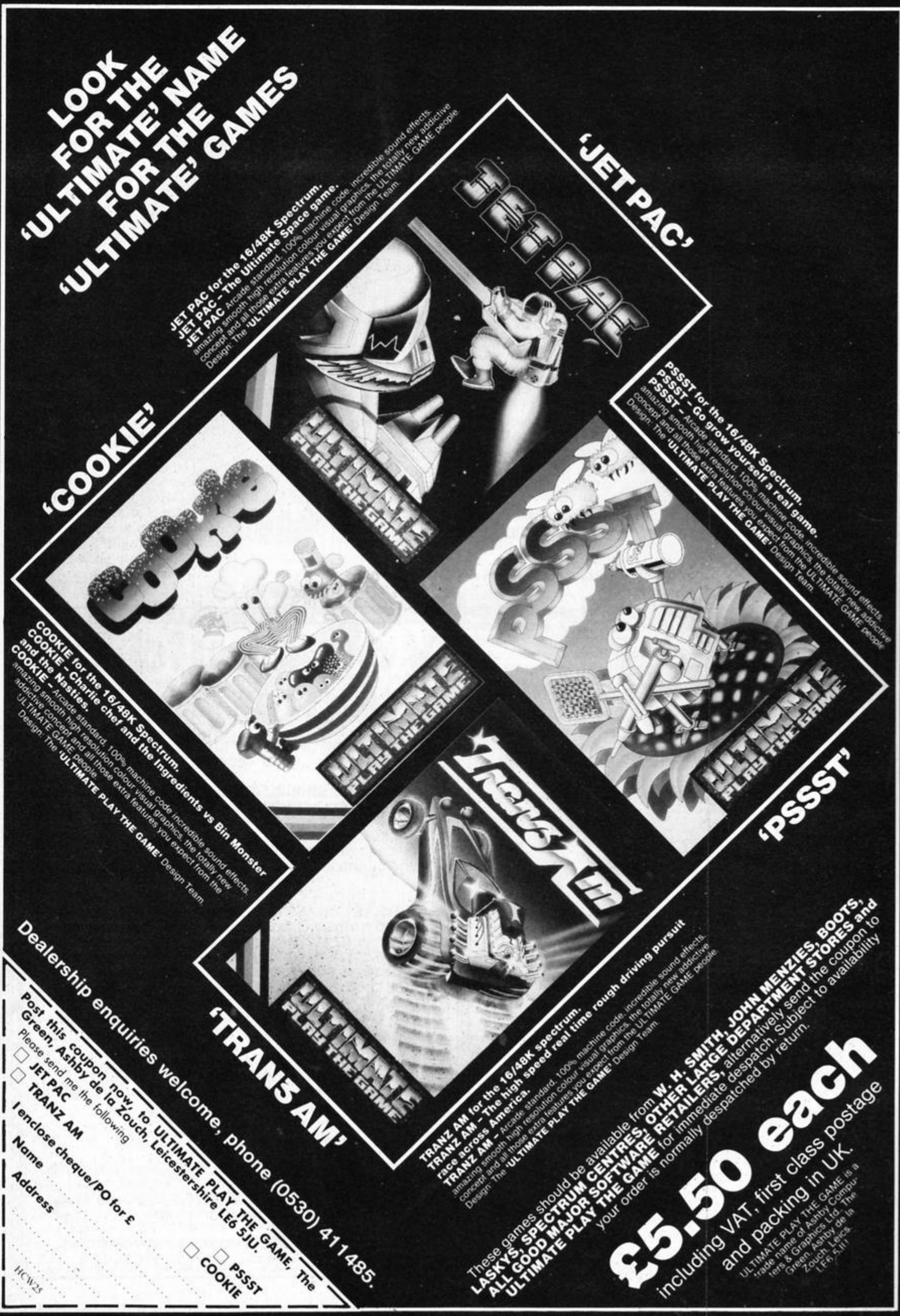

These games should be available from **W. H. SMITH, JOHN MENZIES, BOOTS, LASKYS, SPECTRUM CENTRES, OTHER LARGE DEPARTMENT STORES and ALL GOOD MAJOR SOFTWARE RETAILERS,** alternatively send the coupon to **ULTIMATE PLAY THE GAME** for immediate despatch. Subject to availability your order is normally despatched by return.

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Learning at home

It just goes to show that you can't keep a good micro down.

After Sinclair's early setback in the educational market, when the Spectrum missed out on being chosen by the government for use in secondary schools, it has bounced back. It is now the first company to offer the Microelectronics Educational Programme range of educational software direct to consumers.

The Spectrum did get picked for use in primary schools, along with the BBC B and RML 480Z. The MEP range that Sinclair is now selling was specially commissioned by the Department of Education for use with these three micros, and includes programs for maths, reading, language development and problem solving.

Sinclair believes that there still aren't enough micros in schools for children to make the most of the software range, and by selling it commercially, hopes to encourage learning at home too.

The four packs in the range each contain two software cassettes and full instructions, and cost £24.95 each.

Sinclair Research, Educational Division, Stanhope Road, Camberley, Surrey GU15 3PS

Spectrum gets down to business

Oxford Computer Publishing has come up with two ways of making your Spectrum do some work for its living.

Finance Manager is intended for small business as well as home accounting, and has facilities to deal with automatic double entry, standing orders, account balances, new transactions, and bank statement reconciliation.

Address Manager is a filing, indexing and retrieval system for over 400 addresses (in 48K).

Both programs are written in machine code and both cost £8.95. Finance Manager is for the 48K Spectrum only.

OCP, Brimrod, 4a High Street, Chalfont St Peter, Bucks SL9 9OB

Filing made simple

Simple Software, formerly specialists in programs for the Pet, are now branching out into material for the Commodore 64.

Simple's latest offering is Simply File, a disk based database management system for the 64 and Pet.

As the name suggests, the program is basically an electronic filing system which enables you to index, group and search for records by a number of crieteria.

It will also carry out calculations on goups of records, output information in the form of files for use with other programs, and if you've got a printer it will print out labels and summaries of selected groups of records.

Should you have the Simply Write wordprocessing package, it will work in conjunction with that too. Capacity is about 400 records of 254 characters each. Price: £69.

Simple Software, 15 Havelock Road, Brighton, Sussex BN1 6GL

Cartoons on computers

Cartoon strips B.C. and The Wizard of Id are being turned into a series of games and educational programs.

At first they will go on sale in America and Canada, but the Sydney Development Corporation says they will be coming to the U.K. soon.

Sydney has signed a licensing deal to use the characters created by award-winning U.S. cartoonist Johnny Hart. His strips appear in several U.K. newspapers, including London's Standard.

Over the next 18 months Sydney, based in Vancouver, plan to bring out eight programs — for computers like Atari and Commodore 64 — called Quest for Tires, Wiztype, Wizword, Wizlab, Wizmath, Wizspell, Dot to Dot Zot and Bung Juggler.

Talking about maths

Children aged four to six can learn basic maths with a VIC-20 program which "speaks" to them, says Currah Computer Components.

Chattermaths, priced at £4.99, generates its voice from word sounds to ask and answer the questions. Correct answers make a figure climb a ladder.

Currah says the program is the first of a range of educational "speechware" for different age groups.

Currah Computer Components, Graythorp Industrial Estate, Hartlepool, Cleveland

Price cuts that fuel micro wars

The millions upon millions of promotional pounds now being lavished on small computers (£4m from newcomer Mattel, £10m from veteran Commodore) underline one widespread and unforeseen side effect of the micro-electronics revolution. That is, to create so great a product proliferation as to destroy price levels, make competition a nightmare and utterly bewilder the consumer.

Since using the personal computer itself can be bewildering, the result is one of the strangest boom markets in history.

All over the world, people are buying sophisticated machines in very large quantities and often at stiff prices: even after a £116 cut, the Commodore 64 still costs £229. Yet many purchasers are not using their new babies to anything like their full potential. It's no longer true, in the States at least, that the overwhelming home use is for playing infantile games. But early infancy is the present age of the computerised home.

• • •

Paradoxically, toy manufacturer Mattel is now trying to make the home computer more adult by offering a £100 console that will save lucky purchasers the bother of switching on the light. But is the buyer wise to fork out £79.95 for Mattel's Aquarius offering, without that optional extra? Is the Sinclair Spectrum worth its few pounds more? And what about all the alternatives, extant and on the way?

Because of the attractive potential of the market and the ease of design, manufacture and entry created by the chip, it's almost anybody's game.

So sweeping a spate of introductions and innovations simply give the consumer too much choice: rational buying decisions have become as difficult in this market as in hi-fi, where again model proliferation is to blame. The consequences are already evident and inevitable.

• • •

The price wars that have forced down Sinclair's bottom-of-the-range price to $29 in the States will become endemic in many markets. The office of the future, for instance, is likely to be hit by price wars even before that future has become reality.

The pace will plainly become too hot for some. Already, Texas Instruments has run into huge losses, while Timex (which makes Sinclair's computers and markets them in the States) has met some heavy weather. If it were to founder, or if Sir Clive's expected new offering fails to wow this oversupplied market the outlook for Britain's pioneer would become thick with dark cloud — especially now that the Americans are raising the advertising ante so steeply, while cutting prices as sharply.

Truth has become as strange as fiction. In 1967, when Ivor Williams began his Management Today *series on a mythical company called Minipute, he thought up an obviously mythical product: the expendable computer.*

At $29, his dream has practically come true. The only trouble is that it probably means many expendable companies.

Robert Heller
Editor, Management Today
(this column is reproduced from Marketing magazine)

• This space is for you to sound off about the micro scene, to present bouquets or to hurl brickbats. Share your views by sending them to Paul Liptrot, Opinion, Home Computing Weekly, 145 Charing Cross Road, London WC2H 0EE. Please include your occupation and your interest in computing

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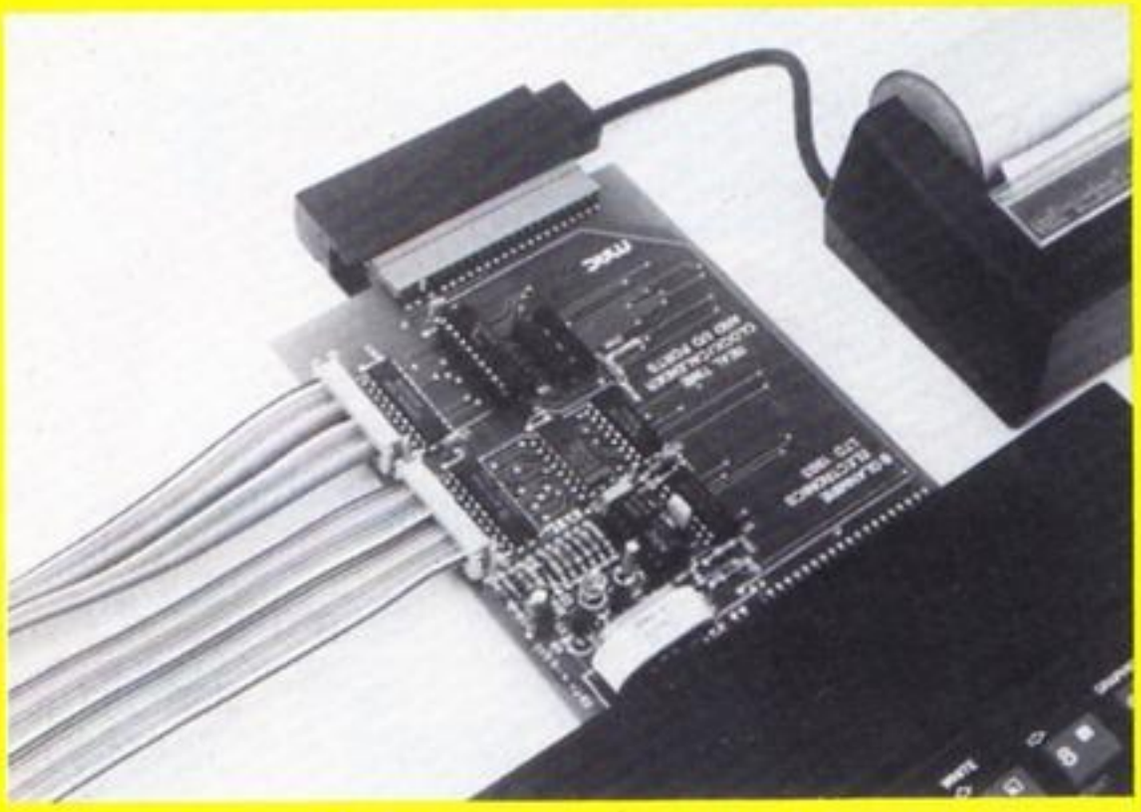

Glanmire's Controller lets your ZX micro keep an eye on the time

Clockwatching computers

Glanmire Electronics has developed a clock which allows the ZX81 and Spectrum to tell the time in months, days, hours, minutes and seconds, and to switch other devices on and off under program control.

The Time Controller normally uses the computer's own power supply, but contains a rechargeable battery which, so the makers say, would keep going for over a year should the main power supply fail.

It has eight programmable inputs and outputs, and comes with full instructions to tell those with some knowledge of electronics how to go about connecting up a light switch, burglar alarm, or whatever they might want to control.

Alternatively, if you really can't face the thought of dabbling in electronics, Glanmire is working on an interface which will allow external devices to simply plug into a socket.

The Time Controller costs £34.50 for the ZX81 and £38.50 for the Spectrum.

Glanmire, Westley House, Trinity Avenue, Bush Hill Park, Enfield EN1 1PH

Software for a rare beast

If you own that rare beast the Lynx, a new company has come on to the scene to sell software for it. Bus-Tech is Steve Pearson, Julia Hine and David Sims-Mindry, who hope to have their first programs ready to sell within a few weeks.

Though initially the company will be offering six arcade-type games — Lynx Muncher, Battle Brick, Death Ball, Zombie Panic, SS Orion and 3D Maze — the aim is to have some educational software and a graphics utility soon.

Meanwhile, with each order, Bus-Tech is giving away a simplified version of the graphics utility free. The games will be priced in the £4.50-£6.50 range.

Bus-Tech, 19 Landport Terrace, Portsmouth, Hants

Recorder discount

If you buy a Spectrum from Smiths, you can get a £10 discount off the price of Smiths' own-brand computer-compatible cassette recorder, the CCR800, which normally costs £34.95.

A Smiths spokeswoman said that the offer would be open 'indefinitely'.

W H Smith, Strand House, 10 New Fetter Lane, London EC4 1AD

Fast lane to the show

If you're planning on going to the Personal Computer World Show at the Barbican next month, you can dodge the queues by sending off for "fast lane" tickets.

As well as getting you into the show without having to wait, the tickets are cheaper than those bought on the day — £2 instead of £3.

The show is on from 29 September to 2 October, from 10 am until 7 pm — apart from the Sunday, when the show closes at 5 pm.

Montbuild, 11 Manchester Square, London W1M 5AB

Acme, son of Bug-Byte

Bug-Byte has spawned another new software company.

First some employees left to set up Imagine, and now Alan Maton, 32, and his 26-year-old wife Soo have done the same.

Acme Software's home is a small office in The Albany, a building in central Liverpool where Bug-Byte began.

Bug-Byte co-director Tony Milner said: "It tends to happen at this time of year, in time for the Christmas sales.

"Allan is a good friend of mine and we have have parted on amicable terms. I wish him the best of luck and I think he's going to need it. It's quite difficult to make a name for yourself now.

"You are dealing with a few large firms who know what they are doing and have been doing it for several years.

"I hope Alan makes it. He's got the knowledge and the get-up-and-go."

Mr Maton, whose first four games go on sale in September, said: "You can't beat being your own boss. It's quite a challenge and I'm enjoying every minute of it.

"If I fail I've only got myself to blame, but if I succeed I will have one of the biggest heads around."

At Bug-Byte Mr Maton was responsible for despatch and checking on stocks at dealers and distributors and Mrs Maton was Mr Milner's secretary.

They say all their games will cost £5. Two of the first four are for the VIC-20: Alien, a space game, and Bridgeman, in which the player guides a man across bridges.

Connect Four is for the Lynx and Practically Impossible, a five-level abstract game, runs on the Spectrum.

The next release will be an adventure for the Oric and Colour Genie.

Acme will soon have its first employee, 16-year-old programmer Chris Cannon, whose job will be to evaluate programs.

At first the programs will be sold by mail only and then, Mr Maton says, Acme will establish a dealer network and take on more staff.

Acme Software, 49-51 The Albany, Old Hall Street, Liverpool

EDITORIAL ASSISTANT

Computing today

Due to promotion, **Computing Today** is seeking an Editorial Assistant. The person we are looking for is an accurate worker with a sense of humour who will be able to maintain the high standards of the magazine while keeping to deadlines. Knowledge of program assessment, development and debugging is required, both in BASIC and machine code/assembly language (preferably for the Z80 and/or 6502). Applicants should be able to express themselves in English but no journalistic experience is necessary: training in technical journalism will be provided.

Familiarity with other languages, particularly Pascal and FORTH, would be an advantage, as would a general knowledge of electronics.

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Arcade action in your living room

Our reviewers look at five more arcade clones and find that, on the whole, there's life in the old themes yet

Spriteman Commodore 64 £7

Interceptor Micros, Lindon House, The Green, Tadley, Hants

This is not a game to start playing if you have to go out in the next hour. It is a version of Pacman where you run round a maze eating dots pursued by four ghosts.

If you eat a power pill then you can eat the ghosts rather than them eating you but after a short time they rematerialise at the centre of the maze and are again in pursuit.

The instructions are clear and concise and give you a guide to tactics you might use to attain a high score. A joystick makes life much easier especially with the speed some of the ghosts move at.

The graphics are very good and, even if you are not skilful enough to get past the first screen, the game is fun and compulsive.

A minor criticism — the running score is cramped at the top of the screen and unless you achieve the highest score you get little chance to read it when you have run out of your three lives.

This is particularly relevant when you have three or four children playing, and they want to keep track of their personal attainments. **B.P.**

instructions	80%
playability	85%
graphics	80%
value for money	90%

★ ★ ★ ★ ★

Galactic Invasion Jupiter Ace plus 16K £6.50

JRS, 15 Wayside Avenue, Worthing, Sussex BN13 3JU

The V-shaped invaders come, as is usual, from above and the gun fires at them from below: both are UDGs; the gun at least is realistic.

Keys Z and C move the ship left or right, it says, but hey! Where's the ship?

We have to imagine it, against the background of muted noise, as the shots zap home and the invaders evaporate like beeping bats.

Your score is kept and previous highs recorded till surpassed by the summated efforts of your three lives. There are also three levels of difficulty, though the two hardest are much the same.

This is really quite a good implementation of the old favourite, but I would be more enthusiastic if I had not seen it so often done rather better by machines with colour and using machine code.

The third expert level would really have to be written in assembler if it is to achieve a noticeable advance on the "fast" level where the Forth is practically flat out. **G.M.**

instructions	80%
playability	70%
graphics	70%
value for money	75%

★ ★ ★ ★

Frogger VIC-20 £5.99

Rabbit, 380 Station Road, Harrow HA1 2DE

For the benefit of any Martians who have just bought a VIC-20, Frogger involves piloting a small frog across a large road followed by a large river to its resting place on the opposite bank.

The journey faced by the amphibians in this program is very hazardous involving slow cars, fast cars, buses, turtles, logs and alligators.

Noticable by their absence are several features of the original game such as diving turtles, little bonus frogs which can be carried to safety and a time limit, but the game is complex and challenging as it stands.

Graphics are good, especially the alligators — not for faint-hearted frogs. Sound is almost non-existent, a fact I have noted in several Rabbit productions, but I suppose you can't have everything.

No bugs were found except possibly the lack of time limit. The bottom right hand corner of the screen clearly shows the words Time Frogger, but that's as far as it goes.

It makes a change to do something humane for once instead of wiping out yet another galactic civilisation.

M.B.

instructions	70%
playability	80%
graphics	80%
value for money	75%

★ ★ ★

Space Invaders TRS-80 Models I & III, Genie I & II £14.95

Molimerx, 1 Buckhurst Road, Town Hall Square, Bexhill-on-Sea, E Sussex

This version differs from many Space Invaders in that it allows the user to set a large number of variables at the commencement of any game. Such attributes at the accuracy and number of alien bombs, games speed, bomb type and scoring are just some of the customizing that may be set.

Sound is also available, though I couldn't get the benefit of it on my TRS-80 model III.

Alien space ships gradually move down the screen, attacking your laser base which you move along the bottom of the screen by the use of the up and down arrow key. The aliens drop bombs from their ships and should you be hit by one of these you lose one of your laser bases. Graphic blocks are conveniently sited for you to hide behind but gradually get destroyed as they are hit by your fire or bombs from the aliens.

The game is written in machine language and is, therefore, capable of very fast action at the higher level of difficulty. The game would probably not be of interest to owners of other invader programs but the level of customizing that is provided makes it a very worthwhile version. **D.B.**

	50%
instructions	70%
playability	50%
graphics	60%
value for money	

★ ★ ★

Maze Chase Spectrum £4.95

Hewson, 60A St. Mary's Street, Wallingford, Oxon OX10 0EL

Unlike some programs, this one does not pretend to be what it isn't; it is basically Pacman, plus or minus a few features. There are four ghosts, a man (instead of a mouth), and dots, and bonus strawberries and lemons to eat.

The ghosts are all white and behave in exactly the same way as each other — they do not have names and personalities like their arcade brothers. The graphics are just user defined characters and are not very clear.

There are four mazes on the 16K version and 12 on the 48K version. You can't choose which one you want. They appear randomly, and there is not a great difference between them.

The strawberries and lemons are randomly placed in the mazes. When you eat a strawberry you get 100 points and the ghosts turn purple, allowing you to eat them. They do not stay in this state of trepidation for long and give no warning when about to regain their courage.

I quite often found myself being eaten by a white ghost when I was expecting to eat a purple one.

The man is controlled using the unbiguitors cursor control keys. The program remembers the last key pressed, so you can press a different key in advance of the turning. **M.T.**

instructions	75%
playability	70%
graphics	40%
value for money	60%

★ ★ ★

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Warning: cigarettes can damage your home, your guests ... and your robot

Careless smokers cause fires. Can your heroic robot collect the cigarette ends before your party turns to ashes? Find out with Tony Garner's program for the standard TI-99/4A

It's a great party, but your guests can't seem to find the ashtrays.

Luckily, you have a robot which should collect the cigarette ends — guided by you and your TI-99/4A — before they become a fire hazard.

If a room contains 10 cigarette ends the heat causes it to burst into flames and, if the robot is trapped in the room, he perishes and the game comes to an end.

Otherwise he carries on with his heroic mission in the other rooms until her has cleared up the number of cigarette ends you selected when the game began.

Each time he bumps into a guest, a wall of furniture his circuits are temporarily disrupted and he becomes inactive while three extra cigarettes are dropped.

If four rooms are destroyed the game becomes a question of survival — the player's original figure is ignored while the demoralised robot tries weakly to keep two rooms, and finally one room, clear.

There is no limit to the number of cigarettes that can be requested but, for a competitive game, it would be best to increase them gradually from about 30.

Regardless of average, the best score is the highest. But the average can be increased by intentional crashes. These increase your possible score without raising the number by which it is divided.

The range of the robot can be altered by changing the total of GOSUB 260 lines between 110 and 220.

The game can be made more dangerous by adding more GOSUB 710 lines in the same place or between lines 560 and 590.

How it works

110-230 main routine
250 initialisation
260-420 new position for robot
430-440 check for obstacle, cigarette
450 reduce cigarette total by one
460-490 increase score by 10, reduce by rooms destroyed multiplied by 25, prevent negative score
500-540 set flag for score routine, call cigarette plotting and robot position routines, restore last robot co-ordinates
550 crash
560-690 robot sleeps while three extra cigarette ends are plotted, end robot move routine, plot new robot position, print new score if flag set, unset flag
700-760 produce random position for cigarette end, preventing it landing on occupied square; give square a "cigarette value", plot cigarette end, increase cigarette total by one
770-800 store robot co-ordinates, take over co-ordinate variables
810 calls cigarette plot/unplot routine
820-830 restore robot variables
840-920 if 10 cigarettes in room one place chair in each doorway and give doorways "chair values", remember (890) which room, call subroutine for dimensions, call burning subroutine, set cigarette total to zero
930-1370 subroutines for the other five rooms
1390-1490 burning routine scans room, left to right, painting and erasing flame, leaving ash behind. 1440: burning noise
1500 tests to see if robot destroyed
1510-1760 game end messages, reset, return to start if any key pressed
1770 returns from burning room subroutine if robot still alive
1780-1950 subroutine to decide which room has had change in cigarette total, read dimensions of room to be burned
1960 increases factor which reduces score
1980-2070 define characters
2080-2160 set up colours
2160-2220 title page, instructions
2230-2240 player inputs number of cigarettes, figure stored
2250-2750 draw walls, give every square an "obstacle value", print doors, give "clear space" values to squares either side of doorways
2760-2930 plot 30 chairs, 30 guests in unoccupied squares. 2870 ensures men and women are plotted alternately
2940-2970 first position of robot
2980-3030 print score indicator, start

Variables

BO number of cigarettes to be dropped
M number of rooms burned down
V,W store robot's vertical (R), horizontal (C) co-ordinates
D ASCII value of key pressed
E cigarette total
TOT basic score
SC score after adjustment
FL flag to show score has changed
CR$ current score as string
P,Q cigarette's vertical, horizontal co-ordinates
RR,CC stores for R,C
S(X) total of cigarettes in room (X)
SP room
L(1),L(2)/K(1),K(2) horizontal/vertical dimensions of room to be burned
AV score divided by BO
HSC high score
BAV average for high score
BOA store for BO
ST indicates nature of keypress: same, different, none
A character to be defined
N$ hexadecimal string defining character
GR graphics character for male or female guest

Hints on conversion

CALL KEY returns ASCII value in the variable D
CALL SOUND generates note or noise in following order: duration (negative values enable program to proceed during sound), note value (110 is low, 262 is middle C), volume (0 is loud, 30 is quietest). A negative value from 1 to 8 produces noise: three notes and one noise can be bracketed for same duration
CALL HCHAR plots character by row (1-24), column (1-32), ASCII value and, if needed, number of repeats after and including first position, horizontally
CALL VCHAR as above, but vertical
CALL COLOR sets character set (multiples of eight from 32 to 159), foreground colour (1-16) and background colour (1-16): **1** transparent, **2** black, **5** dark blue, **7** dark red, **10** light red, **12** light yellow, **13** dark green, **14** magenta

The data in line 1950 will need to be adjusted to the new dimensions of the rooms, which will be set, depending on screen size, in lines 2260-2620. Doors will also have to be altered.

Graphics designed in 2040-2070 are: **42** robot, **120** flame, **128** ash, **136** cigarette end, **144** chair, **104** female guest, **96** male guest, **152** top wall, **154** bottom wall, **155** interval wall horizontal, **156** central corridor, **157** vertical wall.

The program sits well inside genuine 16K, but the array DIMensioned in 240 consumes a lot of memory.

The TI does not allow multiple statement lines, but these may well be required for other machines will less available memory.

The GOSUB structure should make life easy for the BBC micro users to make a straightforward adaptation.

```
100 GOTO 240
110 GOSUB 260
120 BO=BO-1
130 IF BO=0 THEN 1510
140 GOSUB 260
150 GOSUB 260
160 GOSUB 260
170 GOSUB 710
180 GOSUB 260
190 IF M=5 THEN 140
200 GOSUB 260
210 IF M=4 THEN 140
220 GOSUB 260
230 GOTO 110
240 DIM MEM(22,28)
250 GOTO 1980
260 V=R
270 W=C
280 CALL KEY(0,D,ST)
290 CALL SOUND(-75,262,2)
300 IF D=88 THEN 350
310 IF D=68 THEN 370
320 IF D=69 THEN 390
330 IF D=83 THEN 410
340 GOTO 700
350 R=R+1
360 GOTO 430
370 C=C+1
380 GOTO 430
390 R=R-1
400 GOTO 430
410 C=C-1
420 GOTO 430
430 IF MEM(R,C)=3 THEN 530 ELSE 440
440 IF MEM(R,C)=2 THEN 450 ELSE 600
450 E=-1
460 TOT=TOT+10
470 SC=TOT-(25*M)
480 IF SC<10 THEN 490 ELSE 500
490 SC=0
500 FL=1
510 GOSUB 1780
520 GOTO 600
530 R=V
540 C=W
550 CALL SOUND(-250,165,2,1047,2,1760,2)
560 GOSUB 710
570 GOSUB 710
580 GOSUB 710
```

TI-99/4A PROGRAM

```
590 RETURN
600 MEM(R,C)=1
610 MEM(V,W)=0
620 CALL HCHAR(V,W,32)
630 CALL HCHAR(R,C,42)
640 IF FL=1 THEN 650 ELSE 700
650 CR$=STR$(SC)
660 FOR J=1 TO LEN(CR$)
670 CALL HCHAR(24,13+J,ASC(SEG$(CR$,J,1)))
680 NEXT J
690 FL=0
700 RETURN
710 P=INT(RND*16)+5
720 Q=INT(RND*22)+4
730 IF (MEM(P,Q)=1)+(MEM(P,Q)=2)+(MEM(P,Q)=3)+(MEM(P,Q)=4)THEN 710
740 MEM(P,Q)=2
750 CALL HCHAR(P,Q,136)
760 E=1
770 RR=R
780 CC=C
790 R=P
800 C=Q
810 GOSUB 1780
820 R=RR
830 C=CC
840 IF S(1)=10 THEN 850 ELSE 930
850 CALL HCHAR(15,5,144)
860 MEM(15,5)=3
870 CALL HCHAR(12,9,144)
880 MEM(12,9)=3
890 SP=1
900 GOSUB 1910
910 GOSUB 1390
920 S(1)=0
930 IF S(2)=10 THEN 940 ELSE 1020
940 CALL HCHAR(6,15,144)
950 MEM(6,15)=3
960 CALL HCHAR(12,9,144)
970 MEM(12,9)=3
980 SP=2
990 GOSUB 1910
1000 GOSUB 1390
1010 S(2)=0
1020 IF S(3)=10 THEN 1030 ELSE 1110
1030 CALL HCHAR(15,5,144)
1040 MEM(15,5)=3
1050 CALL HCHAR(20,15,144)
1060 MEM(20,15)=3
1070 SP=3
1080 GOSUB 1910
1090 GOSUB 1390
1100 S(3)=0
1110 IF S(4)=10 THEN 1120 ELSE 1200
1120 CALL HCHAR(6,15,144)
1130 MEM(6,15)=3
1140 CALL HCHAR(9,26,144)
1150 MEM(9,26)=3
1160 SP=4
1170 GOSUB 1910
1180 GOSUB 1390
1190 S(4)=0
1200 IF S(5)=10 THEN 1210 ELSE 1290
1210 CALL HCHAR(20,15,144)
1220 MEM(20,15)=3
1230 CALL HCHAR(18,21,144)
1240 MEM(18,21)=3
1250 SP=5
1260 GOSUB 1910
1270 GOSUB 1390
1280 S(5)=0
1290 IF S(6)=10 THEN 1300 ELSE 1380
1300 CALL HCHAR(9,26,144)
1310 MEM(9,26)=3
1320 CALL HCHAR(18,21,144)
1330 MEM(18,21)=3
1340 SP=6
1350 GOSUB 1910
1360 GOSUB 1390
1370 S(6)=0
1380 RETURN
1390 FOR Y=L(1)TO L(2)
1400 FOR Z=K(1)TO K(2)
1410 CALL HCHAR(Y,Z,120)
1420 CALL HCHAR(Y,Z,32)
1430 MEM(Y,Z)=3
1440 CALL SOUND(-750,-5,15)
1450 CALL HCHAR(Y,Z,120)
1460 CALL HCHAR(Y,Z,32)
1470 CALL HCHAR(Y,Z,128)
1480 NEXT Z
1490 NEXT Y
1500 IF MEM(R,C)=3 THEN 1510 ELSE 1770
1510 CALL CLEAR
1520 AV=SC/BOA
1530 IF SC>HSC THEN 1540 ELSE 1560
1540 HSC=SC
1550 BAV=AV
1560 PRINT TAB(10);"THAT'S IT";;;"FINAL SCORE=";SC;"WITH";BOA;"CIGARETTES";"ORI
GINALLY TO BE";"CLEARED AWAY";;
1570 PRINT "YOUR AVERAGE=";AV;;
1580 PRINT "REMEMBER YOU CAN";"IMPROVE YOUR AVERAGE";"[IF YOU DARE] BY CAUSING";
"OCCASIONAL ACCIDENTS";;
1590 PRINT "BEST SCORE SO FAR =";HSC;"AT AN AVERAGE OF";BAV;;
1600 PRINT ;;"PRESS ANY KEY TO PLAY AGAIN";;
1610 CALL KEY(0,D,ST)
1620 IF ST=0 THEN 1610
1630 CALL CLEAR
1640 PRINT "SETTING UP NOW";;;;;;;;;;;;
1650 FOR R=1 TO 22
1660 FOR C=1 TO 28
1670 MEM(R,C)=0
1680 NEXT C
1690 NEXT R
1700 SC=0
1710 TOT=0
1720 M=0
1730 FOR J=1 TO 6
1740 S(J)=0
1750 NEXT J
1760 GOTO 240
1770 RETURN
1780 IF (R<15)*(C<9)THEN 1790 ELSE 1800
1790 S(1)=S(1)+E
1800 IF (R<15)*(C>9)*(C<15)THEN 1810 ELSE 1820
1810 S(2)=S(2)+E
1820 IF (R>15)*(C<15)THEN 1830 ELSE 1840
1830 S(3)=S(3)+E
1840 IF (R<9)*(C>15)THEN 1850 ELSE 1860
1850 S(4)=S(4)+E
1860 IF (R>9)*(C>15)*(C<21)THEN 1870 ELSE 1880
1870 S(5)=S(5)+E
1880 IF (R>9)*(C>21)THEN 1890 ELSE 1900
1890 S(6)=S(6)+E
1900 RETURN
1910 RESTORE 1950
1920 FOR J=1 TO SP
1930 READ L(1),L(2),K(1),K(2)
1940 NEXT J
1950 DATA 3,14,4,8,3,14,10,14,16,21,4,14,3,8,16,27,10,21,16,20,10,21,22,27
1960 M=M+1
1970 RETURN
1980 RANDOMIZE
1990 RESTORE 2040
2000 FOR J=1 TO 12
2010 READ A,N$
2020 CALL CHAR(A,N$)
2030 NEXT J
2040 DATA 42,92FE92387CFEFE44,120,0010101A495D7F7F,120,2041021009401280
2050 DATA 136,00000075,144,003C2424247E4242,104,1818121E183C1818,96,181848781800
0818
2060 DATA 152,0000000000000FF,154,FF,155,FF0000AA000000FF
2070 DATA 156,8181818181818181,157,9181918191819181
2080 CALL COLOR(2,5,1)
2090 CALL COLOR(9,2,1)
2100 CALL COLOR(10,14,1)
2110 CALL COLOR(12,10,12)
2120 CALL COLOR(14,7,1)
2130 CALL COLOR(15,13,1)
2140 CALL SCREEN(10)
2150 CALL CLEAR
2160 PRINT TAB(3);"  * ROBOT FIREWATCH * "
2170 PRINT "* COLLECTS DROPPED DOG-ENDS.";;
2180 PRINT "USING THE CURSOR KEYS YOU";"HAVE TO STEER *";"AROUND SIX ROOMS IN";"
A HOUSE WHERE A PARTY"
2190 PRINT "IS BEING HELD.";"IF * HITS A GUEST";"OR A WALL OR A CHAIR";"HIS CI
RCUITS TAKE TIME";"TO RECOVER."
2200 PRINT "IF TEN CIGARETTE ENDS";"ARE CONCENTRATED IN ONE ROOM";"NOTHING CAN P
REVENT A FIRE";"=POINTS LOST!"
2210 PRINT "AND WHEN ONLY TWO ROOMS";"REMAIN *'S
MORALE  FALLS.";"SKILL LEVEL DE CIDES"
2220 PRINT "HOW MANY CIGARETTES";"ARE DROPPED BEFORE
THE GAME ENDS.";"INPUT YOUR NUMBER NOW."
2230 INPUT BO
2240 BOA=BO
2250 CALL CLEAR
2260 CALL SCREEN(15)
2270 FOR C=4 TO 27
2280 CALL HCHAR(2,C,152)
2290 MEM(2,C)=3
2300 NEXT C
2310 FOR C=4 TO 27
2320 CALL HCHAR(22,C,154)
2330 MEM(22,C)=3
2340 NEXT C
2350 FOR R=3 TO 21
2360 CALL HCHAR(R,3,157)
2370 MEM(R,3)=3
2380 NEXT R
2390 FOR R=3 TO 21
2400 CALL HCHAR(R,28,157)
2410 MEM(R,28)=3
2420 NEXT R
2430 FOR C=4 TO 14
2440 CALL HCHAR(15,C,155)
2450 MEM(15,C)=3
2460 NEXT C
2470 FOR C=16 TO 27
2480 CALL HCHAR(9,C,155)
2490 MEM(9,C)=3
2500 NEXT C
2510 FOR R=3 TO 21
2520 CALL HCHAR(R,15,156)
2530 MEM(R,15)=3
2540 NEXT R
2550 FOR R=3 TO 14
2560 CALL HCHAR(R,9,157)
2570 MEM(R,9)=3
2580 NEXT R
2590 FOR R=10 TO 21
2600 CALL HCHAR(R,21,157)
2610 MEM(R,21)=3
2620 NEXT R
2630 CALL HCHAR(6,15,32)
2640 CALL HCHAR(12,9,32)
2650 CALL HCHAR(18,21,32)
2660 CALL HCHAR(9,26,32)
2670 CALL HCHAR(15,5,32)
2680 CALL HCHAR(20,15,32)
2690 RESTORE 2740
2700 FOR I=1 TO 18
2710 READ R,C
2720 MEM(R,C)=4
2730 NEXT I
2740 DATA 6,14,6,15,6,16,12,8,12,9,12,10,18,20,18,21,18,22
2750 DATA 8,26,9,26,10,26,14,5,15,5,16,5,20,14,20,15,20,16
2760 FOR I=1 TO 30
2770 R=INT(RND*16)+5
2780 C=INT(RND*22)+4
2790 IF (MEM(R,C)=3)+(MEM(R,C)=4)THEN 2770
2800 MEM(R,C)=3
2810 CALL HCHAR(R,C,144)
2820 NEXT I
2830 FOR I=1 TO 30
2840 R=INT(RND*16)+5
2850 C=INT(RND*22)+4
2860 IF (MEM(R,C)=3)+(MEM(R,C)=4)THEN 2840
2870 IF INT(I/2)=I/2 THEN 2880 ELSE 2900
2880 GR=96
2890 GOTO 2910
2900 GR=104
2910 MEM(R,C)=3
2920 CALL HCHAR(R,C,GR)
2930 NEXT I
2940 R=5
2950 C=26
2960 MEM(R,C)=1
2970 CALL HCHAR(R,C,42)
2980 N$="SCORE="
2990 FOR J=1 TO LEN(N$)
3000 CI=ASC(SEG$(N$,J,1))
3010 CALL HCHAR(24,7+J,CI)
3020 NEXT J
3030 GOTO 110
```


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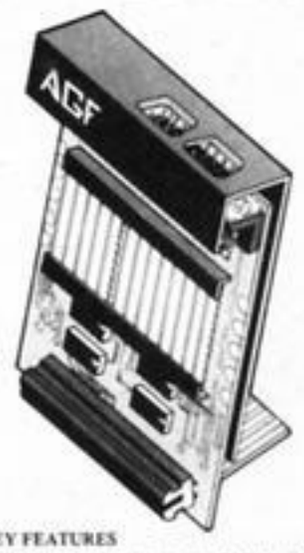

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Economical strings

Ray Elder quite correctly points out in his article, The REMarkable REM, that using a string variable to store data on the ZX81 effectively uses more than twice as much memory as the length of the string, when the string is defined in a program line. His suggested method of using a REM statement combined with PEEK and POKE is a valid and useful method of handling data.

However, there art two possible ways of using strings to store data which do not involve wasteful "double-up" of the data. The most familiar of these is to define the string by means of a command rather than in a program line. Thus you can write a command:

```
LET A$="123456789"
```

and then a program to PRINT the data may be:

```
10 FOR J=1 TO LEN A$
20 PRINT A$(J)
30 NEXT J
```

This routine must be activated by the command GOTO 10, as RUN would CLEAR A$. Another method, perhaps not so familiar, avoids the use of string variables altogether, although it does utilise a string in a program line; it has the additional benefit that the program can be RUN:

```
10 FOR J=1 TO 9
20 PRINT CHR$(PEEK(PEEK(16396)+256*PEEK(16397)+J));
30 NEXT J
```

Obviously this is an extremely simple example for illustration purposes.

One could also write, for example:

```
10 FOR J=1 TO 30 STEP 3
20 PRINT VAL("&"+CHR$(PEEK(PEEK(16396)+256*PEEK(16397)+J))+CHR$(PEEK(PEEK(16396)+256*PEEK(16397)+J+1))+CHR$(PEEK(PEEK(16396)+256*PEEK(16397)+J+2)));
30 NEXT J
```

or:

```
10 FOR J=1 TO 10
20 PRINT 256*CODE(A$(J))+CODE(A$(J+1));
30 NEXT J
```

Here is a printout from the last example above:

```
1353
12345
12345
1234
1706
1561
1306
4357
5144
1203
```

In this case, the first string in line 20 contains the most significant byte, and the second string contains the least significant byte, of a two-byte data set.

Of course, use of the technique need not be limited to PRINT statements; the forms GOTO... LET X=.... IF VAL..." data "(J..J+n) THEN.... can all be used, as with any other value in a program line.

Nick Godwin, Eyemouth, Berwicks

Microfair goes north

I have good news for M. Logan who, in HCW 17, complained about the lack of microfairs in Scotland.

The Strathclyde Home Computer Fair takes place on August 26-27, at the McLellan Galleries, Sauchiehall Street, Glasgow.

The fair will open to the public and exhibitors are from not only Scotland but from the whole of the British Isles.

We hope that this will be the first of many yet to come, as we feel sadly left out in the microfair circuit.

M. P. Sloan, Jarak Sales, Hamilton, Scotland

It's time we leaned on micro makers

I am starting a Rat File on the Oric!

I am one of those poor unfortunates who bought an Oric. Misled by their advertising, Professional Keyboard! 16 Colours! 28 days delivery! I am also one of the unfortunates who was so badly misled by the Oric switchboard about delivery dates.

If any of your readers have brought an Oric and feel that they were deliberately misled, either in the Oric specifications or delivery dates, I would be pleased to hear from them.

Similarly I would like to hear from anybody who has had experienced problems with their after sales service. I am still waiting for a reply to a letter which I wrote to Peter Harding (Sales Director) in April at the request of their P.R. consultant.

We, the computer-buying public, have been badly served by the manufacturers and I feel it is time that we put some pressure on them.

Sinclair, Acorn and Commodore have also misled us with unrealist delivery dates, ambiguous specifications and/or very late "coming soon" add-ons. But I bought an Oric, so it's Oric that I'm making a fuss about.

One other point to the software houses, following recent reports, letters and opinions. Don't expect too many women customers when successful adventurers are rewarded by marrying princesses. If you want to alienate half your potential market and, ultimately, half your potential authors, fine, as long as that is what you intend to do.

Keith Ollett, Hookstead, Goldsmith Avenue, Crowborough, East Sussex TN6 1RG

My Oric's not so bad

Having read many articles in established computer magazines (Home Computing Weekly being one), I have found that people who write in about the Oric-1 always point out the bad point and ignore the good.

I have had my Oric now for nearly six months and I am very pleased with it. (It seems I am the only person who is!)

Admittedly it was very late in arriving, but when it did come I found that what you can do is only limited by your imagination and your ability to write programs; and as software is becoming more readily available, things are definitely looking up for Oric owners.

Alan Greenshields, East Lothian, Scotland

Problems with Vanguard

There seems to be a few problems with the listing of my VIC-20 program Vanguard, which was published in HCW 21. Most people who typed the program in have probably ironed these out for themselves by now, but for the benefit of whose who haven't, the problems and solutions are as follows:

Line 6530 should read POKE 198,0: WAIT 198,1

The line number 6515 between 6900 and 8000 should actually be 7000, and you should also remove PRINOO from the beginning.

Line 6900 should read:

6900 PRINTTAB(Q) "GREEN G RED 2 SPACES GREEN F":RETURN

The words inside the square brackets are control colours and spaces.

One last thing; the intialisation program is the second one.

Peter Berrecloth ■

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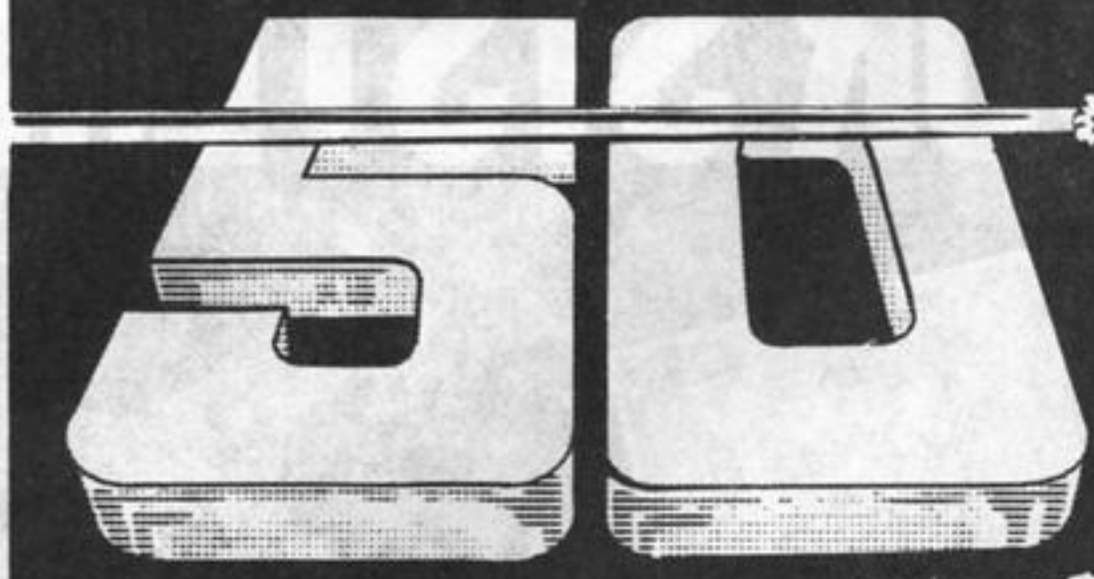

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Matrix Commodore 64 joystick only £8.50

Llamasoft, 49 Mount Pleasant, Tadley, Hants RG26 6BN

This is an action-packed game making very good use of the 64's sound and colour features. Your spacecraft is located within a matrix. Its mission — to clear the zone of droids (snake-like creatures racing around).

While avoiding the bombs from the droids, you also have to avoid the laser beams fired vertically and stay clear of delayed action bombs fired horizontally across the matrix.

If, by some miracle, you clear the zone of droids then you proceed to the next higher zone, of greater complexity. There are 20 zones in all.

On your travels through the zones you are likely to meet nasty humanoids who point out your position to the enemy, deflector beams that rebound your shots, and caravans of camels (Llamas?). When you get hit you explode in a multicolour shower of sparks with equally impressive sound effects.

The instruction card is very good, setting the scene for the game and giving a detailed explanation of the scoring etc.

L.C.

instructions	90%
playability	80%
graphics	90%
value for money	80%

★ ★ ★ ★ ★

Kaktus Commodore 64 + joystick £9.20

Supersoft, Winchester House, Canning Road, Wealdstone, Middlesex HAS TSJ

This game must be one of the most unusual yet devised for the 64. The object is to protect a large green cactus in the centre of the screen from an assortment of desert creatures.

Wasps and hornets circle the cactus and gradually get lower until they take a bite from the base, all the time discharging a mist of "droppings" which eat into the supporting desert floors.

Purple buzzards drop bouncing eggs, lethal to your missile base and which eat away the ground in great chunks.

Green bleeping moles fill in patches of ground and can trap your base on each side of the cactus, but these give bonuses when shot.

Your cactus can survive 10 bites at its base, and points can be earned if the roots are left intact, but if the ground should be eaten away, the cactus will fall in an explosion of green, and you will lose a life.

64 owners should enjoy this game for its graphics and originality, but bear in mind it is fairly expensive. **D.A.**

instructions	70%
playability	67%
graphics	80%
value for money	65%

★ ★ ★ ★

Android 1 Spectrum £5.95

Vortex Software, 280 Brooklands Road, Manchester M23 9HD

If you buy Android 1 — The Reactor Run — you can give up any hope of spending stress-free evenings with your Spectrum.

Your mission is to save the world by infiltrating a reactor complex which is guarded by four different types of mutants, and destroy the reactor — within a time limit.

To infiltrate the complex your robot, Android 1, must blast his way through the walls that surround each stage. But remember to watch out for the aliens. The farther you get through the less predictable the guards become, and the more difficult they are to avoid.

The graphics are colourful and the action is accompanied with well-thought-out sound effects. Android 1 runs, rather than glides, across the screen in an endearing manner.

There are five skill levels — the most difficult seems impossible, while the easiest is fast enough to be a challenge. There is a wide choice of keys but controlling the robot is difficult. Provision is made for the Kempston joystick.

The comprehensive on-screen instructions are attractively presented. The game loaded in five stages, which makes for a long wait, but there were no loading problems.

S.E.

instructions	75%
playability	85%
graphics	85%
value for money	75%

★ ★ ★ ★

Acnean Mutoids BBC 32K £6.50

Soft Joe's, Claughton Road, Birkenhead, Merseyside L41 6ES

This game doesn't fit any preconcieved categories.

It is really a cross between an adventure, a minefield and a maze game. You wander around a captured spaceship looking for weapons and keys whilst avoiding invisible aliens.

The stated aim is to survive and to set the self destruct mechanism so that the aliens are prevented from reaching Earth. But simple survival was my main problem.

The game gets rather boring after a while, despite the six play levels. If you are unfortunate enough to find an alien before any weapons then the game is extremely short and rather pointless. The real problem is that the game relies far too much on random factors and not enough on skill for lack of it!).

The graphics are good, although to make the playing area larger the characters are rather small. I especially like the advancing alien showing its teeth.

The choice of control keys is, however, most strange and could be much improved. Since the game's written mostly in BASIC, response time is rather slower than I would like. The cassette is well priced for its contents and should appeal to younger players. **D.C.**

instructions	70%
playability	60%
graphics	80%
value for money	90%

★ ★ ★ ★

Mangrove Commodore 64 £9.20

Supersoft, Canning Road, Harrow, Middx HA3 7SJ

This game can be played with a joystick or keyboard. It requires you to maintain a cluster of healthy cells against attacking cancerous ones.

As you move around the screen you leave behind a trail, of healthy cells, but they only survive if they are next to four healthy ones.

The wandering cancerous cells can quickly break up your large groups into small clusters which then wither away. In fact, so quickly, that I found the game frustrating and equally quickly lost interest.

The screen display is clear and makes use of customised characters for the cells. At the top of the screen is displayed, the number of healthy cells remaining, the current score and the highest score.

You can obtain some respite from the onslaught of the hostile cells by firing off a dose of radiation, but you have limited supplies.

Although the instruction card that comes with the game is quite clear I think some younger children will find it hard to appreciate the mechanics.

The concept behind the game is good but I feel it could have been implemented more imaginatively with better graphics and sound. **L.C.**

instructions	70%
playability	50%
graphics	50%
value for money	50%

★ ★ ★

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11-100 main loop
110-210 instructions
220-295 set up screen
300-370 end of game
380-395 tune
440-420 new high score

Your orders are to clear the dud mines . . . avoiding the live ones. Stephen Saxon briefs you on your mission for the unexpanded VIC-20

The galactic war is going through a quiet phase and the generals have decided that the minefields need clearing up. . . and you've been given the job.

You have to guide your minesweeper through the minefield, collecting the dead mines while avoiding the live ones.

The program makes use of multi-coloured graphics and Commodore's standard characters. Instructions are given in the program, written for the unexpanded VIC-20.

Hints on conversion

If you convert this program, bear in mind that the screen size of the VIC-20 is 22 by 23 and that you will have to find alternatives to the VIC's characters.

The POKEs are:
7680-8185 screen locations (add 30720 for colour locations
36874-36877 sound oscillators
36879 screen and border colours
CHR$(14) sets lower case and CHR$(142) sets upper case.

```
0 VO=36878:POKEVO,13*16+15:HI=150:HI$="VIC-20":GOS
UB110
5 POKEVO+1,14:PRINT"■"
10 GOSUB220
15 D=INT(RND(1)*15)
20 FORI=0TO20
25 GETM$:IFM$="A"THEND=D-1
30 IFM$="Z"THEND=D+1
35 IFD<0THEND=0
40 PO=7680+I+22*D:PC=30720+PO
45 IFPEEK(PO+1)=43THENSC=SC+10:L=L+1:POKEVO-2,240:
POKEVO-2,0
50 IFL=15THENGOSUB220:GOTO15
55 IFPEEK(PO+1)=42THENV=1:GOTO300
60 IFPEEK(PO+1)=223ORPEEK(PO+1)=233THENV=2:GOTO300
65 POKEPO,42:POKEPC,2+8
70 POKEPO+1,87:POKEPC+1,6+8
75 POKEVO-4,128:POKEVO-4,0
80 FORT=1TO80:NEXT
85 POKEPO,32:POKEPO+1,32
90 PRINT"■■■■■■■■■■■■■■■■■■■■■■■■■■■SCORE=";SC:PRINT"
 HI:-"HI;
95 NEXT
100 GOTO15
110 POKEVO+1,76:PRINTCHR$(14)"■■■      \ /  ●O T_
    ";
115 PRINT"■■■■■■■■■■(-) ●. \.●AXON          APRIL
 1983"
120 GOSUB380
125 PRINT"■■■■■■■■NSTRUCTIONS ( I OR /)?"
127 POKE198,0
130 GETA$:IFA$="Y"THEN145
135 IFA$="N"THENRETURN
140 GOTO130
145 PRINT"■■■      \ /  ●O T_      "
150 PRINT"■■  IHE OBJECT OF THIS   GAME IS TO CLEA
R UP"
155 PRINT" THE DEAD (■+■) MINES    WHILE AVOIDING
THE    LIVE MINES (*)."
160 PRINT"■■  IHE CONTROLS ARE:-  ■■■■■■■■ - /■
      ♦ - T O/"
165 PRINT"■■■■■■■■■■■■■■■■■■■
```

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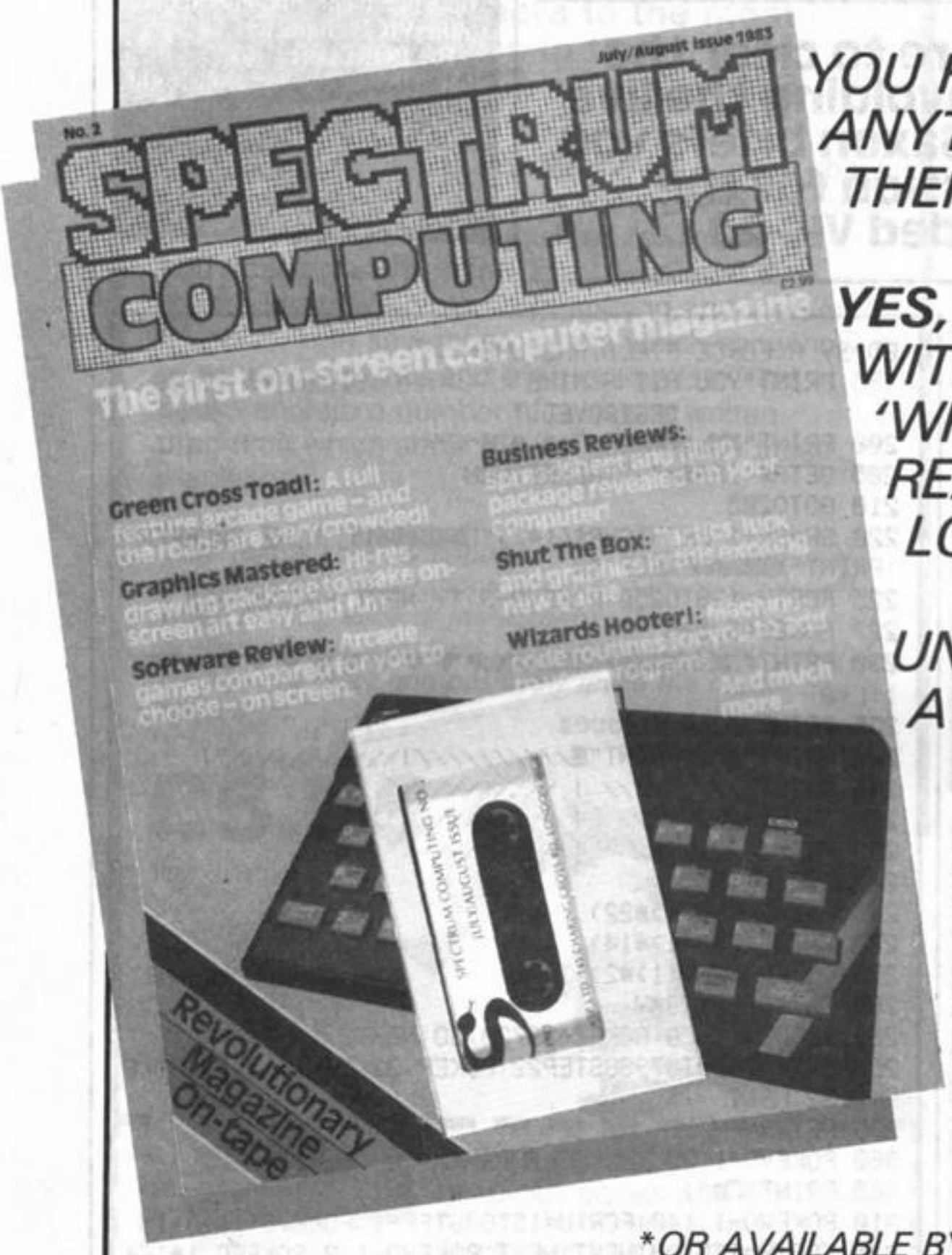

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Software off the beaten track

Read our reviewers' ratings of these five programs, which reveal some unexpected uses for your micro

Cycle Planner/ Growth Tracker 48K Spectrum £7.25

Medidata, PO Box 26, London NW9 9BW

It is unusual to find one, let alone two programs which actually have some genuine practical use in the home. Designed primarily for use by women, these two could be of educational value for the whole family.

'Cycle planner' starts by providing some useful facts about the female menstrual cycle, then proceeds to a calculator routine which allows women to calculate probable dates of maximum fertility, including the time of greatest risk, and the date of birth of a child if conception occurs.

If the cycle is irregular, the dates of the first day of at least the last three cycles have to be entered to estimate future dates. There is no way to store any data, so this information has to be re-entered each time the program is used.

Another minor criticism is the lack of error-trapping when a numeric input is requested.

'Growth tracker' is a data base for extracting information on the growth of a foetus before birth, development of a child (up to 24 months) after birth, and information on five of the most common childhood diseases.

This cassette certainly won't be sold in the same numbers as space games, which is a pity, for it's much more useful and educational than Invaders. **D.N.**

instructions	80%
ease of use	80%
display	50%
value for money	70%

★ ★ ★ ★

Cocktails 48K Sharp MZ-80K £5.50

Epsom, 25 Chartwell Place, off Downs Road, Epsom, Surrey

Here's a little gem for the tipplers amongst us! The program lists 102 different cocktails — imagine, you have to get through 102 recipes before you start to repeat yourself!

Enter the contents of your drinks cabinet and, after going into a trance, the computer will list the cocktails you can make from your stock of drinks.

A second option gives on alphabetical list of all 102 recipes. Browse through the list, using 999 to call the next page, and then enter the number of the cocktail you want to make. The computer will list the recipe of your choice.

The program is supplied on cassette, complete with a clear and well written set of User Notes. All this means there should be no problems in getting up and running.

Written entirely in BASIC, program ARRAYs are LOADed from DATA statements so initialistation and searches can be on the slow side. Don't let this worry you as the program RUNs well and is a pleasure to use — especially after the fourth recipe!

Good value for money and entertaining as well. Not bad going for a utility program. **I.H.**

instructions	80%
ease of use	80%
display	80%
value for money	85%

★ ★ ★ ★ ★

Stock Control 48K Sharp MZ-80K £5.50

Epsom, 25 Chartwell Place, off Downs Road, Epsom, Surrey

This utility program for the MZ-80K is designed for the stock-control of the contents of a domestic deep freezer. Supplied on cassette, it comes with four sheets of user notes.

For each stock item, the program records item number, description, unit of measure, stock level, minimum acceptable stock level, stock value, data of last receipt and date of last issue. There is also a field for notes.

Various reports are available, any of which may be sent to a printer if required. The program will list by stock type or generate a total stock value. An extra three special reports are available: slow moving stock report, minimum stock report, and nil stock report.

You are taken through each program section by a menu, and HELP key is provided.

Considering the application, the program could be accused of overkill but for a good, reasonably fast stock control program, this fits the bill nicely.

As the program is written, a maximum of 50 items may be held on file. With a 48K machine this could be stretched to 255 items. Mind you, the program will run slower.

One annoying minor bug — the "N" INPUT for wrong date is not accepted as it stands. A simple mod would correct this. **I.H.**

instructions	70%
ease of use	65%
display	80%
value for money	75%

★ ★ ★

Learn to play guitar Spectrum £6.00

Lasersound, Stratford Workshops, Burford Road, London E15

If you want to learn to play classical guitar, this is not the program for you because no instruction is given in playing individual notes. But it's OK if you want to accompany songs by learning chords.

A tune to accompany can be played and letters flash up at appropriate points in the lyric to denote the chords that should be played.

Finger positions for over 50 different chords are illustrated, if required, but no information on how to play chords is given. Nevertheless, this is an excellent reference.

Six different notes can be played for tuning, but no instruction in tuning is given. However, the correct "beep" values can be worked out from the Spectrum manual, so this is not a valuable option.

A conversion table is displayed but I was unable to decipher it and its importance is not explained.

I could not load the last option which should be a list of tunes.

With the exception of those on loading, the instructions and explanations are almost non-existant — which is appalling for an educational program. **S.E.**

	15%
instructions	25%
playability	50%
graphics	30%
value for money	

★ ★

Pools 48K Spectrum £20 plus

Football Enterprises, Anvon, 9 New Road, Haverfordwest, Pembs SA61 1TU

Pools apparently calculates probable draws on past-performance basis, selecting 22 matches for entry as 'Zeep' perms of 900 or 3600 lines.

Instructions unhelpfully load separately, are rambling and contradictory, and there was difficulty in reaching some program-options from the menu.

Every week you must input number-coded details of **all** matches on the coupon and **all** results — very carefully, because there's no error-trap routine.

'Zeep' perms are not full perms — eight score-draws can come up without winning. Costwise, a stake of 25p seems impossible and the suggested 45p or £1.80 presumably applies to Zetters (low dividends). Littlewoods require £6 or £24 stakes.

Everyone gets the same selection, so shared dividends could be pennies, but you are committed to send the author £55 if three first dividends come up.

With no facility for the Australian pools, testing must await the start of the UK soccer season but, using an old coupon, it achieved two score-draws and two noscore-draws. I do better with my pin. **D.C.**

instructions	50%
playability	50%
graphics	40%
value for money	25%

★

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CAMSOFT: Draughts & Metric Converter (unex/£3.25), Master Wordsearch (8-16K/£5.00).

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What's the score? Over to you and your computer

Don't be stumped for the latest score. Simon Edwards' Superscore program for the 48K Spectrum will bowl them over at the local cricket club. Or you could try to catch out TV's computer

```
  0 >REM *e\ RESTORE MOVE *SIN
COD!  GO SUB R RESTORE STR$ <>
  1  IF INKEY$="" THEN GO TO u
  2 LET a$=INKEY$: RETURN
  3 GO SUB 450: PRINT AT u,z;v(
inn): IF INT (n/x)=n/x THEN RETU
RN
  4 PRINT AT r+s,z;" ": LET s=s
(s): PRINT AT r+s,z;"■": RETURN
  5 PRINT AT 20,c;"PLEASE RETYP
E COMMAND     ": BEEP .5,-d
 10 PRINT AT v,z;"      I-lists
Instructions                S.J.Ed
wards 29-6-83          "
 150 GO SUB u  BEEP .1,d
 170 IF a$<"0" OR a$="0" AND cou
nt=z THEN GO TO c
 180 IF a$<"7" THEN GO TO 400
 190 IF a$<"A" OR a$>"Z" THEN GO
 TO c
 200 GO TO (CODE a$-60)*100
 220 IF count=u THEN PRINT AT 19
,2*b;"■ ": LET b=b+u: LET b(d(s)
,i)=b(d(s),i)+u: IF b=6 THEN GO
TO 1920
 290 GO TO d
 300 IF inn=c THEN LET inn=inn-u
 301 IF i>no THEN LET inn=inn-u
 305 CLS : IF v(inn)>t THEN PRIN
T t$(x);" are the winners!";TAB
d;" by ";d-g(inn);" wickets"
 310 IF v(inn)<t THEN PRINT t$(u
);" are the winners!";TAB d;" by
";t-v(inn);" runs"
 320 IF v(inn)=t THEN PRINT "A t
ie!"
 330 PAUSE 100: PAUSE z
 340 GO SUB 2610
 350 CLS : PRINT "V-View Statist
ics";"N-New teams";"S-Same teams
": GO SUB u: IF a$="V" THEN GO T
O 340
 360 IF a$="S" THEN GO TO 5500
 370 IF a$<>"N" THEN GO TO 350
 380 GO TO 5100
 410 LET n=VAL a$: IF n>z THEN L
ET n=u: LET h(d(s),n,i)=h(d(s),n
,i)+u
```

At last the cricket score book can be made redundant.

SuperScore is a cricket scoring program for the 48K Spectrum. A scoreboard is displayed. Input is by single letters or numbers using INKEY$. Information on each innings is retained and can be viewed.

A list of all instructions is included in the program. The program can score in any limited over, one innings, or two innings match.

The program can be used to keep a record of the score when listening to the cricket on the radio. You could try and outperform the Honeywell computer used on TV, if you have a spare set. I also use SuperScore to keep a record of the game of Howzthat.

Alternatively you could take your computer to your local cricket club to impress them with your electronic wizardry.

The program can be SAVEd in mid-game (use command S) which will also save all the variables. To make a copy of the program without variables type Y when the scoreboard is displayed.

With each game you will be asked whether you wish to count each ball. If you reply Y then you must type 0 when no run is scored from a ball. If you reply N then you must remember to type 0 at the end of each over. When a cursor appears remember to press the ENTER key after you have typed the required information.

Note that the dots in the listing should be entered as Graphics A.

How it works

1-2 subroutine to read keyboard
3-4 subroutine for changing strike
5 warns of incorrect keypress
10-290 main loop
300-340 decides on winner
350-380 end of game
410-430 a run has been scored
450-490 subroutine to find out who is in lead
610-690 a bye has been scored
700-710 calls bowling change subroutine
800-890 deceleration
910-990 a wide has been bowled
1210-1220 no ball hit by batsman
1320-1390 prints instructions
1610-1690 a leg bye has been scored
1810-1820 no ball bowled
1910-1945 end of over
1950-1990 subroutine for bowling change
2210-2220 restarts game
2310-2340 saves program in mid-game
2600-2605 calls subroutine beginning line 2610
2610-2688 prints information on each innings
2690-2693 prints more detailed information on batsman
2710-2790 a wicket has fallen
2910-2950 copies program (without variables)
5000-5010 entry point
5100-5220 finds batting team
5230-5350 finds bowling team
5500-5630 sets up variables
5640-5660 new innings
5680-6000 prints scoreboard

Hints on conversion

The three POKEs used have simple functions

POKE 23609,30 produces a beep when a key is pressed.

POKE 23658,0 switches off capslock.

POKE 23658,8 switches on capslock.

Points to remember:

- Three-dimensional string and numeric arrays are used
- STR$ changes a number into a string, VAL does the opposite
- If your computer doesn't use the ASCII codes you will have to amend line 200.

Variables

Constant values:
z = 0, **r** = 3, **c** = 5, **d** = 10, **e** = 11, **f** = 15, **v** = 20, **g** = 22, **l** = 5680, **p** = 23658, **u** = 1.

Arrays giving information on each team in each innings:
v number of runs
g number of wickets fallen
l number of overs faced
f fall of wickets
x number of extras
u number of no balls
t number of wides
y number of byes
z number of leg byes

Arrays giving information on each player in each innings:
r number of runs scored
b number of balls faced
m maiden overs bowled
w number of wickets taken
o number of overs bowled
a runs conceded by bowler
h$ information on how out (also used when loading and saving team names)

Other arrays:
s used in changing strike: s(1) = 2, s(2) = 1
d number of current batsman in team array
e number of current bowler in team array
n$ names of players
t$ names of teams

Other variables:
max overs limit
no number of innings to be played
i denotes whether first or second innings
inn the number of current innings (e.g. bowling side's first innings = 2)
t number of runs needed to be scored
count 1 if each ball is counted, 0 if not
bs bowling strike (1 or 2)
s batting strike (1 or 2)
b number of balls so far in over
m control for maiden over — 0 if no runs have been scored in over
lm number of last man in team array
lw number of runs when last wicket fell
k if team that batted first is batting = 0
if team that bowled first is batting = 11
n control variable
**a$** control variable, usually used to store INKEY$ value
y loop variable

SPECTRUM PROGRAM

```
 420 LET a(e(bs),i)=a(e(bs),i)+n
: LET v(inn)=v(inn)+n: LET r(d(s
),i)=r(d(s),i)+n: IF t>z THEN IF
 v(inn)>t THEN IF inn=x AND no=u
 OR inn=4 THEN GO TO 800
 430 PRINT AT r+s,f;r(d(s),i);AT
 f+bs,23;a(e(bs),i): GO SUB r: G
O TO 220
 450 IF v(inn)>=t THEN PRINT AT
z,f;v(inn)-t;" RUNS AHEAD   ": R
ETURN
 455 PRINT AT z,f;t-v(inn);
 460 IF no=u OR inn=4 THEN PRINT
 AT z,f;t-v(inn)+u;" RUNS TO WIN
";: IF max<>z THEN PRINT AT u,f;
"IN ";max-l(inn);" OVERS"
 470 IF no=x THEN IF inn<>4 THEN
 PRINT " RUNS BEHIND"
 490 RETURN
 610 IF a$<>"B" THEN GO TO c
 620 INPUT "How many runs scored
? ";n: LET y(inn)=y(inn)+n: LET
v(inn)=v(inn)+n: LET x(inn)=x(in
n)+n: PRINT AT 6,f;x(inn): GO SU
B r
 690 GO TO d
 700 IF b<>z THEN GO TO c
 710 GO SUB 1950: GO TO l
 800 LET h$(d(s),i)="     NOT OUT
"
 810 IF o(e(bs),i)=z THEN LET o(
e(bs),i)=u
 820 LET h$(d(s(s)),i)="     NOT
OUT": LET inn=inn+u: IF inn=r TH
EN LET i=x
 830 IF i>no OR inn=c THEN GO TO
 300
 840 IF inn=x THEN LET t=v(u)
 850 IF inn=r THEN LET t=v(x)-v(
u)
 870 IF inn=4 THEN LET t=v(u)+v(
r)-v(x)
 890 GO TO 5640
```

```
 910 PRINT AT v,z;"Type R if the
y ran          Any other key
 if they didn't"
 920 GO SUB u: LET n=u: IF a$="R
" THEN INPUT "No.of runs scored?
";n
 930 LET t(inn)=t(inn)+n: LET v(
inn)=v(inn)+n: LET x(inn)=x(inn)
+n: PRINT AT 6,f;x(inn): IF a$="
R" THEN GO SUB r
 990 GO TO d
1210 IF a$<>"H" THEN GO TO c
1220 INPUT "How many runs scored
? ";n: LET v(inn)=v(inn)+n: LET
r(d(s),i)=r(d(s),i)+n: PRINT AT
r+s,f;r(d(s),i): GO SUB r: GO TO
 d
1320 CLS : PRINT TAB c;"INSTRUCT
IONS-"'"Number";TAB d;"No. of ru
ns scored"'"B";TAB d;"Bye"'"C";T
AB d;"Change bowler"'"D";TAB d;"
Declaration"'"E";TAB d;"widE"'"H
";TAB d;"no ball Hit by batsman"
'"I";TAB d;"list Instructions"'"
L";TAB d;"Leg bye"'"N";TAB d;"No
 ball"'"R";TAB d;"Restarts with
 new game"'"S";TAB d;"Saves game
 and data"'"V";TAB d;"View statis
tics"'"W";TAB d;"Wicket"'"Y";TAB
 d;"copies program"
1330 IF count=u THEN PRINT "0";T
AB d;"No runs scored"
1340 IF count=z THEN PRINT "0";T
AB d;"end of Over"
1390 PRINT AT v,z; FLASH u;"ANY
KEY": PAUSE z: GO TO l
1600 IF a$<>"L" THEN GO TO c
1610 INPUT "How many runs scored
?  ;n: LET v(inn)=v(inn)+n: LET
x(inn)=x(inn)+n: LET z(inn)=z(in
n)+n: PRINT AT 6,f;x(inn): GO SU
B r
1690 GO TO d
1810 IF a$<>"N" THEN GO TO c
1820 LET u(inn)=u(inn)+n: LET v(
inn)=v(inn)+u: LET x(inn)=x(inn)
+u: PRINT AT u,z;v(inn);AT 6,f;x
(inn): GO TO d
1910 IF count=u THEN GO TO c
```

```
1920 LET o(e(bs),i)=o(e(bs),i)+u
: LET l(inn)=l(inn)+u: IF m=z TH
EN LET m(e(bs),i)=m(e(bs),i)+u
1925 IF count=z THEN FOR n=u TO
x: LET b(d(n),i)=b(d(n),i)+u: NE
XT n
1930 LET m=z: IF l(inn)>=max AND
 max>z THEN GO TO 800
1935 LET b=z: LET bs=s(bs)
1940 IF max>z THEN IF o(e(bs),i)
>=max/c THEN PRINT AT v,z;n$(e(b
s));" has bowled the max"'"amoun
t of overs                ": BEEP
 .5,-d: PAUSE u: PAUSE z: GO SUB
 1950
1945 GO SUB 4: GO TO l
1950 CLS : IF inn/x<>INT (inn/x)
 THEN FOR n=e+u TO g: PRINT n-e,
n$(n): NEXT n: INPUT "no. of bow
ler? ";n: LET e(bs)=n+e
1960 IF inn/x=INT (inn/x) THEN F
OR n=u TO e: PRINT n,n$(n): NEXT
 n: INPUT "no. of bowler? ";e(bs
)
1970 IF e(x)=e(u) THEN GO TO 195
0
1980 IF max>z AND o(e(bs),i)>=ma
x/c THEN GO TO 1950
1990 RETURN
2210 IF a$<>"R" THEN GO TO c
2220 GO TO 350
2310 SAVE "SuperScore" LINE 2320
: GO TO d
2320 FOR y=USR "a" TO USR "a"+7:
 POKE y,0: NEXT y: FOR y=USR "a"
+2 TO USR "a"+5: POKE y,60: NEXT
 y: POKE 23609,30: POKE p,8
2330 INK z: PAPER 4: BORDER 4: F
LASH z: BRIGHT z: OVER z: INVERS
E z: CLS
2340 GO TO l
2600 IF a$<>"V" THEN GO TO c
2605 GO SUB 2610: GO TO l
2610 IF inn=u THEN LET a$="1": G
O TO 2640
2620 CLS : PRINT TAB d;"WHICH IN
NINGS?"'"1-";t$(u);" 1st Innings
"'"2-";t$(x);" 1st Innings": IF
no=x THEN IF inn>=r THEN PRINT "
3-";t$(u);" 2nd Innings": IF inn
=4 THEN PRINT "4-";t$(x);" 2nd I
nnings"
2635 GO SUB u: IF a$<"1" OR CODE
 a$>48+inn THEN GO TO 2630
2640 CLS : PRINT "TEAM RUNS (";l
(VAL a$);" overs)";TAB 29;v(VAL
a$): LET n=u: IF VAL a$>x THEN L
ET n=x
2645 IF VAL a$/x=INT (VAL a$/x)
THEN FOR y=e+u TO g: PRINT y-e;"
 ";
2650 IF VAL a$/x<>INT (VAL a$/x)
 THEN FOR y=u TO e: PRINT y;" ";
2660 PRINT n$(y);" ";b$(y,n);TAB
 29;r(y,n): NEXT y: PRINT "EXTRA
S ";u(VAL a$);" nb,";l(VAL a$);"
 w,";y(VAL a$);" b,";z(VAL a$);"
 lb";TAB 29;x(VAL a$): IF y=12 T
HEN FOR y=e+u TO g
2665 IF y=23 THEN FOR y=u TO e
2675 IF o(y,n)>z THEN PRINT n$(y
);TAB f;o(y,n);TAB 18;m(y,n);TAB
 21;w(y,n);"-";a(y,n)
2680 NEXT y: PRINT AT v-u,c;"FAL
L OF WICKETS "': FOR y=u TO g(VA
L a$): PRINT f(y,VAL a$);" ";: N
EXT y: INPUT "Type player's no.
for more info (0 TO RETURN )  ";y
: IF y>z THEN IF a$="2" OR a$="4
" THEN LET y=y+e
2685 IF y=z THEN RETURN
2688 CLS : GO SUB 2690: GO TO 26
40
2690 PRINT n$(y)'r(y,n);TAB c;"R
UNS"'b(y,n);: IF count=u THEN PR
INT TAB c;"BALLS";: IF b(y,n)<>z
 THEN PRINT AT f,z;r(y,n)/b(y,n)
*100;TAB c;"RUNS/100 BALLS"
2692 IF count=z THEN IF b(y,n)<>
z THEN PRINT TAB c;"OVERS";AT f,
z;r(y,n)/b(y,n);TAB c;"RUNS/OVER
"
2693 PRINT AT c,z;h(y,6,n);TAB c
;"SIXES"'h(y,c,n);TAB c;"FIVES"'
h(y,4,n);TAB c;"FOURS"'h(y,r,n);
```

```
TAB c;"THREES";h(y,x,n);TAB c;"T
WOS";h(y,u,n);TAB c;"SINGLES";AT
 v,z; FLASH u;"ANY KEY": PAUSE u
: PAUSE z: RETURN
2710 CLS : PRINT TAB f;"HOW OUT?
";TAB d;"1-Caught";TAB d;"2-Bowl
ed";TAB d;"3-Stumped";TAB d;"4-L
bw";TAB d;"5-Hit Wicket";TAB d;"
6-Run Out";TAB d;"7-Not Out"
2715 GO SUB u: IF a$<"1" OR a$>"
7" THEN GO TO 2710
2720 IF a$="7" THEN GO TO l
2725 IF a$="2" THEN LET h$(d(s),
i)="bowl "
2730 IF a$="3" THEN LET h$(d(s),
i)="St b."
2735 IF a$="4" THEN LET h$(d(s),
i)="Lbw "
2740 IF a$="5" THEN LET h$(d(s),
i)="Hit w"
2741 LET g(inn)=g(inn)+u: LET lw
=d(s): LET lw=v(inn): LET f(g(in
n),inn)=lw: IF count=u THEN LET
b=b+u
```

```
2742 IF b(d(s),i)=z THEN LET b(d
(s),i)=u
2745 IF a$="6" THEN LET h$(d(s),
i)="    RUN OUT     ": GO TO 2760
2750 IF a$<>"1" THEN GO TO 2755
2751 CLS : IF inn=u OR inn=r THE
N FOR n=e+u TO n=g: PRINT n,n$(n
): NEXT n
2752 IF inn=x OR inn=4 THEN FOR
n=u TO n=e: PRINT n,n$(n): NEXT
n
2753 INPUT "No. of fielder? ";n:
 LET h$(d(s),i)="ct"+STR$ n
2756 LET w(e(bs),i)=w(e(bs),i)+u
: LET h$(d(s),i)(c+u TO f)=n$(e(
bs))
2760 CLS : PRINT TAB v;v(inn);"-
";g(inn): LET y=d(s): LET n=i: G
O SUB 2690
2765 IF g(inn)=d THEN GO TO 810
2767 CLS : IF inn=u OR inn=r THE
N FOR n=u TO e
2769 IF inn=x OR inn=4 THEN FOR
n=e+u TO g
2770 IF b(n,i)=0 THEN PRINT n-k,
n$(n)
2775 NEXT n: INPUT "No. of next
batsman? ";n: LET d(s)=n+k
2776 IF b(d(s),i)<>0 OR d(u)=d(x
) THEN GO TO 2767
2780 IF count=u THEN IF g(inn)<>
d THEN IF b=6 THEN GO TO 1920
2790 GO TO l
2900 IF a$<>"Y" THEN GO TO c
2910 CLEAR : SAVE "SuperScore" L
INE 5000
2920 PRINT "V-Verify"'"N-New gam
e"
2930 IF INKEY$="V" THEN VERIFY "
SuperScore": CLS : PRINT FLASH 1
;"O.K.": PAUSE 0: GO TO 5000
2940 IF INKEY$="N" THEN GO TO 50
00
2950 GO TO 2930
3000 GO TO c
5000 CLEAR : FOR y=USR "a" TO US
R "a"+7: POKE y,0: NEXT y: FOR y
=USR "a"+2 TO USR "a"+5: POKE y,
60: NEXT y: LET l=5680: LET z=0:
 POKE 23609,30: LET r=3: LET c=5
: LET f=15: LET x=2: LET g=22: L
ET u=1: LET v=20: LET p=23658: L
ET d=10: LET max=z: LET e=11
5010 POKE p,8: INK z: PAPER 4: B
ORDER 4: FLASH z: BRIGHT z: OVER
 z: INVERSE z: CLS
5100 POKE p,z: DIM t$(x,d): DIM
n$(g,d): DIM h$(e,d): PRINT AT c
,z;"What is the batting teams na
me?": INPUT t$(u)
5110 POKE p,8: CLS : PRINT AT d,
z;"L-Load players names"'"T-Type
 in names": GO SUB u
5120 IF a$="L" THEN LOAD t$(u) D
ATA h$(): GO TO 5150
5130 IF a$<>"T" THEN GO TO 5110
5140 POKE p,z: CLS : FOR n=u TO
e: PRINT n,: INPUT "player? "'h$
(n): PRINT h$(n): NEXT n
5150 POKE p,8: CLS : PRINT AT d,
z;"Do you want to alter any name
s?": GO SUB u: IF a$="N" THEN GO
 TO 5190
5160 IF a$<>"Y" THEN GO TO 5150
5170 CLS : PRINT INVERSE u;"TYPE
 ENTER FOR NO CHANGE": POKE p,z:
 FOR n=u TO e: PRINT n,h$(n): IN
PUT a$: IF a$<>"" THEN LET h$(n)
=a$: PRINT n,h$(n)
5180 NEXT n
5190 POKE p,8: CLS : PRINT AT d,
z;"Do you want to save this team
?"
5200 IF INKEY$="Y" THEN SAVE t$(
u) DATA h$(): GO TO 5220
5210 IF INKEY$<>"N" THEN GO TO 5
200
5220 FOR n=u TO e: LET n$(n)=h$(
n): NEXT n
5230 CLS : POKE p,z: PRINT AT d,
z;"What is the bowling teams nam
e?": INPUT t$(x)
5240 CLS : POKE p,8: PRINT AT d,
z;"L-Load players names"'"T-Type
 in names": GO SUB u
```

SPECTRUM PROGRAM

```
5250 IF a$="L" THEN LOAD t$(x) D
ATA h$(): GO TO 5280
5260 IF a$<>"T" THEN GO TO 5240
5270 POKE p,z: CLS : FOR n=u TO
e: PRINT n,: INPUT "player? "'h$
(n): PRINT h$(n): NEXT n
5280 POKE p,8: CLS : PRINT AT d,
z;"Do you want to alter any name
s?": GO SUB u: IF a$="N" THEN GO
 TO 5320
5290 IF a$<>"Y" THEN GO TO 5280
5300 CLS : PRINT INVERSE u;"TYPE
 ENTER FOR NO CHANGE": POKE p,z:
 FOR n=u TO e: PRINT n,h$(n): IN
PUT a$: IF a$<>"" THEN LET h$(n)
=a$: PRINT n,h$(n)
5310 NEXT n
5320 POKE p,8: CLS : PRINT AT d,
z;"Do you want to save this team
?"
5330 IF INKEY$="Y" THEN SAVE t$(
x) DATA h$(): GO TO 5350
5340 IF INKEY$<>"N" THEN GO TO 5
330
5350 FOR n=e+u TO g: LET n$(n)=h
$(n-e): NEXT n
5500 CLS : PRINT AT d,z;"How man
y innings?": INPUT no
5510 IF no<z OR no>x THEN GO TO
5040
5520 IF no=x THEN GO TO 5570
5530 PRINT AT d,z;"Is there an o
vers limit?": GO SUB u
5540 IF a$="N" THEN GO TO 5570
5550 IF a$="Y" THEN PRINT AT d,z
;"What is the overs limit?": INP
UT max: GO TO 5570
5560 GO TO 5530
5570 DIM h$(g,no,f): DIM s(x): L
ET s(u)=x: LET s(x)=u: LET i=no*
2: LET inn=u: LET t=z: DIM d(x):
 DIM e(x): DIM r(g,no): DIM b(g,
no): DIM m(g,no): DIM v(i): DIM
q(i)
5580 DIM u(i): DIM t(i): DIM y(i
): DIM z(i): DIM l(i): DIM f(d,i
): DIM x(i)
5590 DIM w(g,no): DIM o(g,no): D
IM a(g,no)
5600 DIM h(22,6,no): LET i=u: LE
T t=z: CLS : PRINT AT d,z;"Do yo
u want to count each ball?": GO
SUB u
5610 IF a$="Y" THEN LET count=u:
 GO TO 5640
5620 IF a$="N" THEN LET count=z:
 GO TO 5640
5630 GO TO 5600
5640 LET b=z: LET m=z: LET s=u:
LET lm=z: LET lw=z: CLS : IF inn
/x<>INT (inn/x) THEN LET d(u)=u:
 LET d(x)=x: LET k=z
5650 IF inn/x=INT (inn/x) THEN L
ET d(u)=e+u: LET d(x)=e+x: LET k
=e
5660 LET bs=u: GO SUB 1950: CLS
: PRINT "2nd Bowler next": PAUSE
 z: LET bs=x: GO SUB 1950: LET b
s=u
5680 CLS : PRINT t$(inn-(i-u)*x)
'v(inn);TAB r;"-";g(inn);AT r,v;
"OVERS ";l(inn)'TAB u;d(u)-k;TAB
 4;n$(d(u));TAB f;r(d(u),i)'TAB
u;d(x)-k;TAB 4;n$(d(x));TAB f;r(
d(x),i)'TAB u;"EXTRAS";TAB f;x(i
nn);AT f,z;"BOWLERS";TAB f;"O  M
"'TAB u;n$(e(u));TAB f;o(e(u),i)
;TAB 18;m(e(u),i);TAB 21;w(e(u),
i);"-";a(e(u),i)'" ";n$(e(x));TA
B f;o(e(x),i);TAB 18;m(e(x),i);T
AB 21;w(e(x),i);"-";a(e(x),i)
5690 GO SUB 450: PRINT AT r+s,z;
"*";AT f+bs,z;"*": IF lm<>z AND
lm<>e THEN PRINT AT 9,z;"LAST WI
CKET"'lw'"LAST MAN"'n$(lm);" ";r
((lm),i)
5695 IF count=u THEN FOR n=z TO
b-u: PRINT AT 19,2*n;"* ": NEXT
n
6000 GO TO d
```


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Take a scroll, and add a few flips

We go into the Atari's ANTIC chip with Marc Freebury to find out how to flip pages and use fine scrolling

Scrolling is a widely used term in computing, but what exactly does it mean.?

Well, put the cursor of your computer on the bottom line and press RETURN. The whole screen shifts up one line, leaving a blank one at the bottom.

This is **not** true scrolling — the image you now see is unmoved in physical location. Just the data has been moved and you are still looking at the same memory locations.

A true scroll is achieved by using the screen as a window, and then moving that window. The "cheat" scroll is implemented because it is cheap on memory and quick.

However, what if you have several set screens of information/images to display, as in a menu-driven program?

On most computers the answer is to set the data up in free RAM, then when required copy it into the dedicated screen RAM. One the Atari this is not necessary.

The display list description I gave in an earlier article was a basic outline. Here, we will go into further detail.

The display list is a set of instructions for ANTIC, the video CPU. Setting bit 6 or, in other words, adding 64 to an instruction turns it into an LMS — Load Memory Scan.

The ANTIC chip then uses the next two bytes as an address where it can find the screen memory. Try this:

```
10 DL=PEEK(560)+PEEK(561)*256
20 SCREEN=PEEK(DL+4)+PEEK(DL+5)*256
30 POKE SCREEN,255
```

The display list set up by BASIC mode 0 holds its LMS operands in the 4th and 5th bytes. There is a problem with the LMS, in that it cannot cope with more than one 4K block of memory in one go. For higher resolution screens, or to cross 4K, more LMS instructions are needed. So what?

So, by POKEing the address of the screen RAM we want into the LMS operand, we can instantly change screen — a technique known as page flipping.

Delete line 30 and add this:

```
30 SCREEN=SCREEN+40
40 POKE DL+4,SCREEN-(INT(SCREEN/256)*256)
50 POKE DL+5,SCREEN/256
```

Make sure there is something on the top and bottom lines of the screen, then run this. The whole screen should "scroll" one line. The extra line pulled in at the bottom is inaccessible, and there is a non-visible line at the top of the screen.

This is because the operating system refuses to acknowledge the change. The only way round this is to avoid using PRINT or such statements as PLOT, and keep to PEEK and POKE.

Page flipping is an impressive animation tool. The ability to change the whole screen in an instant lends itself particularly to large scale object movement. Try this:

```
10 START=3072
20 FOR I=0 TO 6:FOR J=0 TO 39
30 POKE START+I*1024+I*40+J,19
40 NEXT J:NEXT I
50 START=12
60 DL=PEEK(560)+PEEK(561)*256+4
70 FOR I=0 TO 6:POKE DL,0:POKE DL+1,START+I*4:NEXT I
80 GOTO 70
```

This shows the speed at which BASIC can operate — moving 40 characters almost faster than the eye can perceive. This also shows up a disadvantage of page-flipping.

This short program uses even screens, or about 6.5K. Thus the number of pages to be flipped between, and the resolution of those pages will have to be offset against the amount of memory available.

Page flipping also fails to allow a smooth progression — transition is instantaneous. For the menu, this is great, but for games it is less than ideal in certain circumstances.

Sometimes we will want to move over a playing area larger than the screen. Although the LMS operand can be manipulated in steps of one byte, the screen is assumed to be 40 characters by 24 lines, and data not of that width will not be displayed correctly. Therefore we are forced into copying the data to the screen.

In the end then, the manipulation is useful in some instances — try designing a complex "front page" for your game, then switching instantly to it. Most commercial games do this and it is very effective.

However, the problems with the format of the data will prevent large scale use of this technique from BASIC.

Now that we understand the principle of the LMS in display lists, we can go further into the uses of the ANTIC instruction set.

The various bits 0-7 on an ANTIC instruction byte invoke various operations. For example, bit 6 indicates an LMS, and combinations of bits 0-3 give the graphics modes available; in BASIC modes 0-11 and to the operating system 0-15. What then of the other bits?

We are going to examine bits 4 and 5. When the computer stores the image of a character, so that it can display it on the screen, it stores it as a sequence of eight bytes, each byte containing one row of the character. The Atari has the inbuilt capability of moving any or all mode lines in increments of one of these bits (ie left and right one dot) and in increments of one of these bytes (ie up and down).

The capability extends to all modes, but is most easily explained and demonstrated using mode 0.

First, we inform the computer of the lines we wish to use this fine-scrolling on, and whether it will be left/right, up/down or both.

Bit 5 enables vertical scrolling, bit 4 enables horizontal scrolling. Generally we will want to scroll the whole screen but we also leave the top line (the one combined with the LMS) as a buffer!

```
10 DL=PEEK(560)+PEEK(561)*256+6
20 FOR I=0 TO 22:POKE I,34:NEXT I
```

Now, the amount of fine-scroll each line takes will depend upon the value we poke into location 54277 — the vertical scroll register. If it was not zero to start with, and you run the above, you might notice a 'shift' in the screen. Don't worry. Type POKE 54277,0 and everything should be normal. The screen can be scrolled by up to 15 dots, that is two BASIC mode 0 lines. Try this:

```
30 FOR I=0 TO 7:POKE 54277,I
40 FOR J=1 TO 50:NEXT J
50 NEXT I
60 GOTO 30
```

LIST the program, then run it. Impressed? Now delete line 60 and add this:

```
60 FOR I=7 TO 0 STEP -1:POKE 54277,I
70 FOR J=1 TO 50:NEXT J
80 NEXT I
90 GOTO 30
```

Again, LIST and RUN.

To gain a continuous fine-scroll, we just finescroll the one line then reset the finescroll to zero and coarse scroll. Thus, delete lines 30 onwards and use this:

```
30 ?CHR$(INT(RND(1)*255))
40 FOR I=0 TO 7:POKE 54277,I
50 FOR J=1 TO 50:NEXT J
60 NEXT I:GOTO 30
```

It doesn't quite work, does it? That sharp jerk is annoying, and even in machine-code it cannot be removed (I've tried).

So what we do is manipulate the LMS to move the displayed screen one line forward. Again this is a technique better suited to machine code but from BASIC we can show the principle.

Change and add the following lines:

```
25 LO=PEEK(DL-2):HI=PEEK(DL-1)
30 FOR I=1 TO 25:?CHR$(INT(RND(1)*255));:NEXT I
60 NEXT I
70 LO=LO+40:IF LO>255 THEN LO=LO-256:HI=HI+1
80 POKE DL-2,LO:POKE DL-1,HI:GOTO 40
```

The slight flicker in this can be ironed out in machine code. Horizontal finescrolling has the added problem that the lines on the screen are contiguous memory locations, so if you scroll one in the middle alone, what comes on at the edge? The answer is that the characters from the line above/below comes on to fill the gap, and as a result the whole screen gets thrown out of line.

This can be demonstrated by changing the 34 in line 20 to a 50. We are now setting both horizontal and vertical finescrolling. Register Horizontal Scroll at location 54276 controls the amount.

To correct the displacement problem, screen data must be arranged and retrieved in lines of greater width than one normal line. So, to do this, we POKE location 559, register DMACTL, with 35. This means that ANTIC will now pull 48 locations per line instead of 40.

It also means that you will have to organise your information accordingly. Now the rough edges are not displayed on screen and scrolling in both directions appears smooth.

For the best example of finescrolling, try getting a look at Eastern Front 1941 from the Atari Program Exchange.

What's new in programmed learning?

Our review panel gives marks out of a hundred to a selection of software for learning at home and at school

Tele-Tutor 1 Dragon £25

Microdeal, 14 Truro Road, St. Austell, Cornwall PL25 5JE

This package contains two cassettes with four items: an oral spelling test, a multiple choice vocabulary quiz, a maths drill, and Estimate, to help in mental arithmetic. An A4 hard-back ring binder contains all the information needed to load and use the programs.

The package is designed for children aged five to adult. An ambitious claim, yet one that is achieved by allowing you to input data in two of the programs — Spelling and Word Drill.

The two maths programs offer different skill levels that adjust as the work progresses, and up to five or six pupils may work at the same time.

All the results are shown at the end and in one case a high res smiling face is formed at the correct answers are given. A nice idea, particularly for schools, is the option to print results.

I found the spelling and vocabulary work too slow for general classroom use. Having put my own data in it took between ten and fifteen minutes per child. Good at home, however, allowing reinforcement of school work.

The maths work, by contract, was very good in school.

There's a lot of potential for this sort of package and it bodes well for the Dragon's future as a school-based computer. **M.P.**

instructions	100%
ease of use	90%
display	n/a
value for money	85%

★ ★ ★ ★ ★

Puncman 1 and 2 BBC 32K £7.95

Chalksoft, Lowmoor Cottage, Tonedale, Wellington, Somerset

"Munch", "scoff" and "pling" could well describe the action of this punctuation exercise game, for children of eight years or above. The good sound and graphics of these programs, using a continuously animated spherical "pacman" motif, promote both good motivation and concentration span, in the children using them.

In play, Punky the Good draws correct text on the screen, the commas, full stops and capital letters of which are then rapidly consumed by the nasty green Nosher the Bad. The child then must put the stolen punctuation back into the text, using the cursor control keys.

The idea is a good one, but the examples of text consist of dreadful comic slang, that even has incorrect punctuation — as all quotes and necesary apostrophes are missing (to make things simpler?). Fortunately, teachers can easily insert their own correct text into the DATA statements within the program. **P.D.**

instructions	60%
ease of use	60%
display	70%
value for money	50%

★ ★ ★

abc lift off Spectrum £7.95

Longman/Micromega, Longman House, Burnt Mill, Harlow, Essex CM20 2JE

A nice "early learner" program. There are two parts to this program and you can choose which you require.

First is the alphabet, the letter A and apple are displayed top left, and in the bottom right corner a drawing of an apple is shown.

By pressing the next letter (B) a new picture (a bus) is drawn and the name written up. This continues throughout the alphabet; a useful trainer program for very young three-plus children.

The second section is a little game. A rocket is drawn then three crates below it which, in-turn, pass beneath it, the contents are revealed and a word is displayed.

Pressing if they match adds the item to the cargo, if not an item is removed. When full the rocket takes off. Good practice in matching words/pictures and alphabetical sequencing.

Good graphics and colour, although sound was not used to the full. Easy to use, interesting and enjoyable. A good, but not outstanding program, which is well error trapped, bug free and reasonably user friendly. My biggest criticism is the price. **R.E.**

instructions	60%
playability	70%
graphics	67%
value for money	20%

★ ★ ★

Facemaker BBC 32K £9.95

ASK, London House, 68 Upper Richmond Road, London SW15

This has to be the most surprising educational program I have seen. The idea is to build up faces on the screen by answering questions about the features and seeing the product of your answers appear.

The questions cover such things as eyes, hair, mouth, ears, etc. and some alternatives are given e.g. small or large for eyes.

My first criticism is that there are not enough alternatives in some cases, like ear size, so you have to make inappropriate choices.

There are also no alternatives for age or colour/ethnic type, so it would not really be of great value in multi-ethnic schools. In fact the question of value is a rather difficult one to assess. I cannot really think of any area of education where this fills a need and the Educational Notes in the accompanying booklet are just as vague as I am!

There is no way I would be prepared to spend this amount of money for the little and gimmicky use this program is likely to get in school or home. One final and major point is the total lack of a screen dumping facility — so your masterpiece is lost forever as soon as another is created. **D.C.**

instructions	70%
ease of use	60%
display	20%
value for money	

★ ★

Hide & Seek BBC 32K £9.95

ASK, London House, 68 Upper Richmond Road, London SW15

Based on the old familiar games of Hide & Seek, Pelmanism and Kim's Game, this program's overall aim is memory training, and it succeeds very well indeed. There are three games usually with more than one difficulty level, so the program will span a large age range.

Besides being useful as a single player game I would suggest that this could be used with a small group of children to encourage communication and discussion skills. The input required varies from single key presses to spelling complete words but the error trapping is such that it is very difficult to crash the program accidentally.

The most outstanding feature of the program is the number and variety of the graphic shapes presented. They are just the right size and are very easily recognisable. The instructions are to the high standard that this company usually presents.

I would however suggest you use command *FX210,1 before loading, as this will stop the constant sound effects from driving you mad. **D.C.**

instructions	95%
ease of use	90%
display	100%
value for money	95%

★ ★ ★ ★ ★

Will you survive to reach the underwater city?

How it works

100-133 set up user-defined graphics
135-139 set up sound
141-155 set up sprites
160-205 print title page, controls
210-214 input level of play, calculations
220-232 set up paper colour etc, underwater drone effect
235-350 main loop, including
250-280 work out and print rock string and tunnel,
290-350 work out whether to move caverns left/right
400-490 city reached graphics, control
1000-1001 thrust sprite, sound
2000-2001 no thrust sprite, sound off
3000-3001 reversing sprite off, sound
4000-4001 steering sprite, sound
5000-5090 ship controls input, calculations
6000-6015 damage counter routine
7000-7900 lose/game over routine, option to replay
8000-8900 win/game over routine, option to replay
9000-9050 edge of caverns, random user-defined graphics selection
50000-50020 sprite data

Take up the challenge of Clive Wright's game for the Commodore 64. It's addictive and makes good use of sprites and graphics

```
10 REM-MANOEUVRE 64
20 REM-COPYRIGHT A.S.P. LTD.
30 REM-BY C.R.WRIGHT 1983
40 REM-WRITTEN EXCLUSIVELY FOR H.C.W.
50 REM-CONVERTED FROM BC BASIC.
60 REM-
99 REM-INTITIAL SETUP AND USER DEF G'S
100 RESTORE:FORK=49152TO49283:READN:POKEK,N:NEXT:SYS49152:CLR:SYS49161
115 FORK=49152TO49283:READN:NEXT:FORK=1TO5:READN:FORJ=1TO8:READN(J):NEXT:QZ=0
120 FORI=12288+(8*N)TO12288+(8*N)+7:QZ=QZ+1:POKEI,N(QZ):NEXT:NEXTK
122 FORK=1TO40:WA$=WA$+"■":SP$=SP$+" ":NEXT
123 REM-UDG LOADER AND CHARACTER DATA
124 DATA169,48,141,52,0,141,56,0,96,169,0,141,14,220,169,51,141,1,0,162,0,189
125 DATA0,208,157,0,48,189,0,209,157,0,49,189,0,210,157,0,50,189,0,211,157,0
126 DATA51,189,0,212,157,0,52,189,0,213,157,0,53,189,0,214,157,0,54,189,0,215
127 DATA157,0,55,232,224,255,208,203,173,255,208,141,255,48,173,255,209,141
128 DATA255,49,173,255,210,141,255,50,173,255,211,141,255,51,173,255
129 DATA212,141,255,52,173,255,213,141,255,53,173,255,214,141,255,54,169,55
130 DATA141,1,0,169,1,141,14,220,169,28,141,24,208,96
131 DATA65,192,224,192,240,248,240,224,224,66,192,240,248,240,240,224,192,192
132 DATA67,7,7,15,31,15,15,7,7,68,7,3,15,7,7,3,15,7,102,255,255,255,255,255,255
133 DATA255,255
134 REM-SOUND SETUP
135 FORK=0TO16:POKE53248+K,0:NEXT:POKE53248+21,0:FORK=0TO28:POKE54272+K,0:NEXT
136 POKE54296,15:POKE54276,129:POKE54278,192
139 POKE54285,192:POKE54283,129
140 REM-SPRITE SETUP
141 FORK=832TO832+41:POKEK,0:NEXT
142 FORK=832+42TO832+62STEP3:POKEK,112:POKEK+1,0:POKEK+2,56:NEXT
145 PRINT"■";:POKE53281,11:POKE53280,5:POKE646,5
150 FORK=766TO784STEP-1:READN:POKEK,N:NEXT
156 REM-INITIAL SCREEN & TITLE
160 PRINT"■■■■■■■■■■■■■■■■■■■■MANOEUVRE■■■■■■■■■■■■■■■■■■■
```

COMMODORE 64 PROGRAM

```
400 PRINT"   ■■ELL DONE YOU'VE REACHED THE CITY■ "
490 NO=1:GOTO400
999 REM-THRUST SPRITE ON AND SOUND
1000 POKE54283,129:POKEV+45,1:POKEV+12,PEEK(V+14):POKEV+13,PEEK(V+15)-20
1001 POKE54280,214:POKE54279,216:RETURN
1999 REM-THRUST SPRITE CHANGE WITH SOUNDOFF
2000 POKEV+45,7:POKEV+12,PEEK(V+14):POKEV+13,PEEK(V+15)-20:POKE54283,128
2001 RETURN
2999 REM-REVERSE SOUND
3000 POKEV+12,0:POKEV+13,0:POKE54279,152:POKE54280,58:POKE54283,129
3001 RETURN
3999 REM-PITCHING SOUND AND SPRITE COL
4000 POKEV+45,10:POKEV+12,PEEK(V+14):POKEV+13,PEEK(V+15)-20:POKE54279,136
4001 POKE54280,19:POKE54283,129:RETURN
4999 REM-SHIP CONTROL ROUTINE
5000 X=0
5001 K=PEEK(197)
5005 IFK=10THENPOKEV+14,PEEK(V+14)-3:GOSUB4000:X=1
5010 IFK=18THENPOKEV+14,PEEK(V+14)+3:GOSUB4000:X=1
5020 IFK=36ANDPEEK(V+15)<230THENPOKEV+15,PEEK(V+15)+3:GOSUB1000:X=1
```

```
5030 IFK=36ANDPEEK(V+15)>50THENPOKEV+15,PEEK(V+15)-3:GOSUB3000:X=1
5035 POKEV+46,8:IFNO=1THEN5090
5040 IFPEEK(V+31)>127THENGOSUB6000:X=1
5050 IFX=1THEN5090
5060 GOSUB2000
5090 RETURN
5999 REM-DAMAGE COUNTER ROUTINE
6000 H=H-1:POKEV+46,7
6010 IFH=0THEN7000
6015 POKE54283,128:POKE54279,0:POKE54280,250:POKE54283,129:RETURN
6999 REM-DAMAGED AND GAME OVER ROUTINE
7000 FORK=0TO24:POKE54272+K,0:NEXT:POKE54296,15:POKE54277,27:POKE54278,0
7001 POKE54276,129:POKE54272,136:POKE54273,19
7007 POKEV+46,1:FORK=1TO2000:NEXT:POKE54276,128:FORK=0TO24:POKE54272+K,0:NEXT
7008 POKEV+21,0:FORK=0TO16:POKEV+K,0:NEXT
7009 PRINT"□                ■■AME OVER■■!"
7010 PRINT"■■YOU SUFFERED TOO MUCH DAMAGE FOR THE"
7020 PRINT"■AUTO-REPEAIR SYSTEMS TO COPE WITH."
7030 PRINT"■■HOWEVER YOU DID LAST:-"
7040 M=VAL(MID$(TI$,3,2)):S=VAL(MID$(TI$,5,2))
7050 PRINT"■■■";M;"MINUTES AND";S;"SECONDS.";
7060 T=M*60+S
7070 IFT<20THENPRINT"!!":GOTO7090
7080 IFT<30THENPRINT"!":GOTO7090
7090 PRINT:PRINT"■■     ■■PRESS ← ONLY FOR ANOTHER GO■□"
7095 POKE198,0
7100 GETA$:IFA$=""THEN7100
7110 IFA$="+"THENRUN
7120 POKE198,0:FORK=0TO16:POKEV+K,0:NEXT:POKEV+21,0
7900 END
7999 REM-REACHED CITY GAME OVER ROUTINE
8000 FORK=0TO24:POKE54272+K,0:NEXT:PRINT"□                ■■AME OVER■■!"
8001 FORK=0TO16:POKEV+K,0:NEXT:POKEV+21,0
8010 PRINT"■■YOU MADE IT,WELL DONE!!!"
8020 PRINT"■IT TOOK YOU :-"
8030 M=VAL(MID$(TI$,3,2)):S=VAL(MID$(TI$,5,2))
8040 PRINT"■■■";M;"MINUTES AND";S;"SECONDS."
8050 PRINT:PRINT"■■     ■■PRESS ← ONLY FOR ANOTHER GO■□"
8055 POKE198,0
8060 GETA$:IFA$=""THEN8060
8070 IFA$="+"THENRUN
8080 POKE198,0:FORK=0TO16:POKEV+K,0:NEXT:POKEV+21,0
8900 END
8999 REM-EDGE OF CAVERNS USER DEF G'S
9000 R=INT(2*RND(1)+1)
9010 IFLR=2THEN9040
9020 IFR=1THENRK$=RK$+"●":RETURN
9030 IFR=2THENRK$=RK$+"|":RETURN
9040 IFR=1THENRK$=RK$+"—":RETURN
9050 IFR=2THENRK$=RK$+"—":RETURN
49999 REM-SPRITE DATA
50000 DATA0,48,0,0,48,0,0,48,0,0,51,3,0,123,3,0,255,3,0,255,3,0,207,3,128,143,7
50010 DATA192,51,15,224,51,31,48,51,51,56,3,115,252,255,255,28,135,227,28,255
50020 DATA227,28,254,225,28,204,224,0,204,0,0,254,1,0,254,1
```


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Top Ten programs for the Spectrum

1	Flight Simulation	Psion (4)
2	Jet Pac	Ultimate (1)
3	Mad Martha	Microgen (9)
4	Transylvanian Tower	Richard Shepherd (3)
5	Super Spy	Richard Shepherd (–)
6	Horace and the Spiders	Psion/M. House (5)
7	Maniac Miner	Bug Byte (–)
8	Test Match	Computer Rentals (–)
9	Arcadia	Imagine (–)
10	Scrabble	Psion (2)

Compiled by W. H. Smith. Figures in brackets are last week's positions

Top Ten programs for the Dragon-32

1	Space War	Microdeal (6)
2	The King	Microdeal (5)
3	Android Attack	Microdeal (7)
4	Nightflight	Salamander (8)
5	Frogger	Microdeal (–)
6	Planet Invasion	Microdeal (9)
7	Cuthbert Goes Walkabout	Microdeal (–)
8	Champions	Peaksoft (–)
9	Dragon Trek	Wintersoft (–)
10	Space Shuttle Simulator	Microdeal (–)

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Top Ten programs for the ZX81

1	Space Raiders	Sinclair (8)
2	Espionage Island	Sinclair (10)
3	Football Manager	Addictive Games (1)
4	Flight Simulation	Sinclair (3)
5	1K Games	Sinclair (5)
6	1K Chess	Sinclair (6)
7	Defender	Quicksilva (2)
8	Scramble	Quicksilva (4)
9	Planet of Death	Sinclair (9)
10	Fantasy Games	Sinclair (7)

Compiled by Boots. Figures in brackets are last week's positions

Top Ten programs for the VIC-20

1	Arcadia	Imagine (1)
2	Wacky Waiters	Imagine (2)
3	Panic	Bug Byte (3)
4	Cosmiads	Bug Byte (5)
5	Catcha Snatcha	Imagine (6)
6	Escape MCP	Rabbit (–)
7	Cyclons	Rabbit (–)
8	Gridrunner	Llamasoft (8)
9	Laser Zone	Llamasoft (7)
10	English Invaders	Rabbit (–)

Compiled by Boots. Figures in brackets are last week's positions

Taking the worry out of buying

Let's start this week's column with a prediction of the future of home computing by certain respected members of the profession.

First of all Clive Smith, research director of the well known Yankee Group. In Mr Smith's opinion, from five to eight million computers will be sold this year (here). He also projects that eventually there will be many computers in each household just like there are radios now.

Some of his other predictions: home computers will be much more commonly used as communications terminals when 1200 baud modems that cost less than $100 become available in quantity; that word of mouth will become the primary criteria for program buying; that home computers will be placed in one of three categories (novelty, 16K, or professional 64K); that there will be at least 30,000 computer dealers in the US by the end of this year; and that dealers will begin to specialize their offerings to one or two lines.

Dan Ross, of Timex Corp., which markets their versions of the Spectrum and ZX81, looks for personal productivity software products to really take off in sales, and for pricing to stabilize with the competitive emphasis shifting to value and features.

Many other leaders agreed that obsolescence of customer's equipment should be minimized, more emphasis should be placed on after-purchase support, and that sales support should feature in-depth product availability.

It would certainly be nice for those predictions to come true. If nothing else, a little stability in the marketplace would be nice. There are many consumers indeed who are afraid to buy the most cost effective product, regardless of whether it is hardware or software, for fear that its maker may not be around in a year or two. They do not want to end up with a very expensive paperweight or dust collector.

★ ★ ★ ★

I rarely mention the availability of software or hardware for the Tandy Color Computer. It isn't that I am biased against the machine. It is just that I hardly ever see anything advertised or written about for it in particular.

Here is the rare exception. Super "Color" Writer II, version 3.0, has just been made available. This little software package is a word processor offering eight high-res lower case displays having true descenders. It also allows 60K of memory using the ROMpak version in a 64K computer or 51K using the disc or tape versions.

Editing functions include locate and change, line insert, block moves, various delete functions, and full cursor control. The program allows you to automatically justify print lines, use super- and subscripts, perform underlining, include headers and footnotes, and pause between single sheet feeds. It also allows you to view a reproduction of the finished copy on the screen before printing it.

Using special horizontal scrolling techniques, you can create and edit pages having up to 240 columns per line. There are programmable functions that will allow you to automatically include standard phrases, edit and create columns, link text files, and other features.

Printing commands can be placed anywhere in the text to control the printed output "on the fly." All versions include the necessary commands to save and load files to tape, while the disc version includes the most up to date disc operating system commands that the Color Computer will support.

The tape and disc versions use at least 32K and cost about $70 and $100 respectively. The ROMpak version requires a 64K machine and costs about $90. For further details contact the manufacturer: Softlaw Corporation, 9072 Lyndale Avenue South, Minneapolis Minnesota 55420. This seems like a very good product for the price.

That's it for this week

Bud Izen **Fairfield, California**

Games to catch you on the hop

If you're hopping mad, these games are for you — they're all based on the Frogger theme.

Frogger TRS-80 Models I and III £14

Microdeal, 41 Truro Road, St Austell, Cornwall PL25 5JE

This game is also available on disc for an extra £2. Both versions are joystick compatible, and can provide sound through an appropriate amplifier.

There's a standard road-and-river scenarios, with the added hazard of crocodiles and snakes in the river.

The producers have done their best to make the most of the TRS-80's limited graphics, and have provided a haunting soundtrack. It's a real pity that the machine doesn't allow colour. The screen is very crowded, and it does take a while to recognise some of the objects.

Having said that, I enjoyed the game, and found it much more playable once I had got accustomed to telling crocodiles apart from logs.

D.B.

instructions	30%
playability	80%
graphics	75%
value for money	50%

★★★

Croaker BBC B £7.95

Program Power, 8/8a Regent Street, Chapel Allerton, Leeds LS7 4PE

This is Program Power's version of the amphibian arcade classic, which places you in control of a somewhat misshapen frog.

Points are awarded for each successful move and for each Frog delivered safely home. Bonus points are awarded for swift completion of each phase, when a family of six frogs are all home. Each phase becomes progressively more difficult.

The game is well presented with concise instructions on the cassette insert. The instructions are also included within the program.

Use of graphics and sound is excellent. Most pleasing is the ability to be able to switch off the background Beethoven. I found one small bug in that the Escape key does not appear to be fully error trapped. Try it and see!

J.W.

instructions	85%
playability	90%
graphics	95%
value for money	85%

★★★★★

Super Frogger TI-99/4A (Extended Basic) £13

By Norton Software, from Stainless Software, 10 Alstone Road, Stockport

The game begins with the question: Do you want to play the Advanced game? If you answer Y you're then asked for the password, which of course you don't know unless you got it by playing sufficiently well at the non-advanced game.

This latter is slow to start, although the graphics are quite good and colourful. You guide your frog across a busy road, followed by splash-free guidance across a river via logs/barges/etc. The occasional crocodile may be thrown in for good measure.

Time is a factor, displayed via a shortening red line, while you attempt to steer your frog across to the opposite riverbank.

You have four 'lives', and once you get the hang of it, it can be quite good fun.

P.B.

instructions	70%
playability	70%
graphics	85%
value for money	20%

★★

Leapfrog TI-99/4A (Extended Basic) £3.99

Saturn Software, 39 River Park, Marlborough, Wilts

Guide a large green frog, firstly across a busy motorway, without being reduced to frog-puree by a thundering juggernaut, and then hopping across a river aided by a number of floating barrells and turtles, until, eventually you reach the sanctuary of your froggy-hole.

The tape contains two versions, one for keyboard and one for joysticks.

The colourful graphics and sound effects were good, making extensive use of Extended Basic's sprite facilities.

The game itself was unfortunately a little limited in scope, missing several features found on other versions. Still, with a price tag of £3.99, it can be considered value for money.

V.A.

instructions	50%
playability	50%
graphics	80%
value for money	70%

★★★★

Frogger 64 Commodore 64 £7

Interceptor Micros, Lindon House, The Green, Tadley, Hants.

Apart from frog, road, and river complete with logs and turtles, other objects on the screen are alligators, worms, crocodiles, lady frogs and flies. The graphics for all of these are of an extremely high standard.

It would have been better, however, if the frog moved smoothly rather than flashing from one place to another.

The game is potentially a winner. The trouble is that it contains some bugs. Strange things sometimes occur when you are three-quarters of the way across the screen: you may lose a life or re-appear in an odd place. Before buying the game I would advise you to check that these have been ironed out.

The keyboard or joystick can be used to play the game — the keys are sensibly placed. **K.I.**

instructions	20%
playability	70%
graphics	90%
value for money	70%

★★★★

The easy way to hi-res colour with your Oric

In another article on handling the Oric's screen display, David Nowotnik shows how to get high-resolution colour, with routines you can try

In my previous article I demonstrated how multicoloured displays may be obtained on the Oric-1 in TEXT mode.

Many of the principles described in that article can be applied to Oric's HIRES mode, but there are a number of differences.

So, although this article aims to show how high resolution colour displays can be obtained on the Oric, I'll start by re-capping on the principles developed last time.

The Oric display file in TEXT mode contains a mixture of characters and attributes. This 'file' is located between 48000 and 49119 on the 48K Oric, and 15232 and 16351 in the 16K version.

The lower address corresponds to the top left screen position; the higher is the bottom right position. Each byte corresponds to one character square of the screen display of 28 rows of 40 characters. The first two characters of each row are the attributes for PAPER and INK. Attributes have byte values between 0 and 23.

The remainder of the row can either be characters (byte values between 32 and 127, and 160 and 255), or more attributes.

The first two attributes in the row define the foreground and background colours for the whole row unless, in progressing right across the row, another attribute is encountered. At this point, the new colour takes over.

Attributes appear as spaces on the screen.

The display file in HIRES mode is far larger than in TEXT, extending from 40960 to 49119 (48K), or 8192 to 16351 (16K). The major part of the display file (40960 to 48959) is devoted to the high resolution chart, while 120 bytes (49000 to 49119) are used for the three rows of TEXT style display at the bottom of the screen.

To demonstrate how the display file is arranged, type in the following short routine, and RUN:

```
10 HIRES
20 FORI=40960TO48959
30 POKEI,60:PRINTI
40 NEXTI
```

As the value 60 is POKEd sequentially into the display file, the address to which the value is placed is printed on the TEXT portion of the screen.

The demonstration should show two things. One byte in HIRES mode stores the dot pattern for one row of six dots. And, the display file starts at the top left of the screen, and works its way across the screen; after 40 bytes (or $40 \times 6 = 240$ dots), the next byte (41000) starts on the left of the second row — and so on down the screen.

Like TEXT mode, the global INK and PAPER colours are stored as attributes on the display file, unless you want a white on black display.

Try a few direct PAPER and INK commands after RUNning the above routine. The display colours will change, and the two left-most columns are replaced by attributes (as they would be in TEXT mode).

Table 1 demonstrates how to calculate the value to be POKEd to give any desired dot pattern. Note that all dot patterns have values between 32 and 127.

Colour attributes have values between 0 and 7, and 16 and 23 (as shown in table 2). Try the following routine:

```
10 HIRES
20 FORI=40960TO48920
   STEP40
30 POKEI,RND(1)*8+16
40 NEXTI
```

You should get thin rows of colour on the screen. Type PAPER 4, and you'll get just one block of colour. Add the line:

```
35 POKEI+20,RND(1)*8+16
```

and RUN again. You get thin colour lines again, but the colours change half way along the row. Line 30 POKEs the background colour attributes down the left hand side of the screen.

This defines the colour for the whole row (without line 35). With line 35, more attributes are placed halfway along each row; these redefine the colour of the right of the attribute. The PAPER command will alter all the attributes in the first column, but not those created by line 35.

The FILL Command can be used instead of POKE. FILL effectively POKEs a number into a specified block of bytes. The top left position of the block used by FILL is the cursor position. Try:

```
10 HIRES
20 FILL 20,10,60
```

This will FILL a block 10 columns across, and 20 rows down with the dot pattern appropriate to the value 60. The block is positioned at the top left of the screen, as the cursor starts at this position. Now, add a line:

```
15 CURSET 20,20,0
```

and RUN again. Now the FILLed block has moved away from the top left; its starting point is 20 rows down, and the integer of $(20/6+1)$ columns across.

Note that after FILL the cursor position is in the byte immediately below the bottom left hand corner of the block filled.

FILL can be used with attributes in the same way, but you should only want to FILL one byte, or one column of bytes, so you would use:

FILL x,1,ATT where x is the number of columns to be filled.

When you have an attribute on the screen, it appears as a blank space. If you use the commands DRAW or CIRCLE, and the line goes through one or more attributes, then nothing will appear on the screen at the attribute position.

For example:

```
10 HIRES
20 CURSET 0,1,0
30 POKE41020,20
40 DRAW200,0,1
```

Note that, should the DRAW command go through several attributes, your program may stop with a system error message.

One final tip about HIRES mode: The command CLS will only work on the TEXT portion on the screen. To clear the screen, use HIRES again.

Table 1 — calculation of the value for dot patterns in HIRES mode

32	16	8	4	2	1

+64

Add up the numbers associated with the boxes (dots) that you want 'switched on', then add 64 (number range 64-127). Note, you can use numbers between 32 and 63, but the left-most dot will always be 'on'.

Table 2 attribute values for Oric colours

Colour	foreground	background
black	0	16
red	1	17
green	2	18
yellow	3	19
blue	4	20
magenta	5	21
cyan	6	22
white	7	23

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Find words you never knew existed

See what your computer can do with words. Bryn Phillips wrote Anagram for the unexpanded VIC-20, but it will easily convert to other micros

Variables

LS(I) characters in word(s)
R(I) order of characters in anagram
SS(I) specified characters in anagram
P(I) position of specified characters
ANS(I) SAVEd anagram
G(I) array to check the characters in anagram match characters in word
NI number of letters in word
LP characters in specified anagram

Impress your friends, offend your enemies. Just let my program loose on their names and it will generate several good — or nasty — anagrams.

It could also be used for semi-serious applications such as Scrabble, crosswords and competitions.

Type it into an unexpanded VIC-20 and the title "Anagram" appears and is randomly rearranged until C is pressed.

You are then asked to enter your word/s, which can be up to 20 characters long.

The program recognises spaces as characters and it's a good idea to include some spaces as this tends to generate the best anagrams.

Now sit back, watch the screen and let inspiration hit you. The computer does the work and it's far easier than fiddling with Scrabble tiles.

If you see a letter grouping which appeals to you press S. You can then enter this grouping anywhere in the anagram and the computer will build round it.

When you have an anagram you like you can SAVE it, plus 14 more. When you have finished, terminate the program and the computer will list your chosen anagrams.

I have written the program in "no-frills" BASIC, avoiding PEEKs and POKEs, to allow easy conversion. It will also run on a Commodore PET.

How it works

15-94 display title
100-200 break up word into characters
210-350 create anagram by randomising all unspecified characters
360-480 print anagram and allow options to be taken
1000-1220 subroutine to allow part of anagram to be specified
1500-1550 subroutine to print options
2000-2080 subroutine to SAVE anagram and to list selected anagrams to date
2500-2540 LIST selected anagrams, end

Hints on conversion

Few problems would be expected in converting this program to run on other micros in BASIC. Considerable use has been made of the cursor controls in the PRINT statements and in converting the program some effort would be required to achieve a satisfactory screen format.

There might also be differences in some of the string handling commands, but otherwise conversion should be straightforward.

```
10 DIM L$(20):DIMR(20):DIMS$(20):DIMP(20):DIMAN$(20):DIMG(20)
15 PRINT"■■■
```

SPECTRUM PROGRAM

Have you got what it takes to face the giant spiders?

If you can't stand spiders you'll hate the man-eaters in this Spectrum program by Clyde Bish. Why not grit your teeth and type it in?

You are on an island inhabited by large man-eating spiders who can sense your location and close in on you.

Fortunately for you, their sense of sight is poor so if you can make them blunder into the ponds which dot the landscape you can reduce the opposition, hopefully to nil.

This is a real-time game so if you don't make a move (use the cursor keys) the spiders will anyway.

Difficulty level 1 is quite easy. You can go above level 3 but you won't stand a chance!

Note: The capital letters within quotes in lines 70, 180, 210, 1110, 1170 and 1190 are user-defined graphics. Enter these in the graphics mode.

Variables

p, q position of man
x, y positions of spiders
s score (how many moves you manage)
m spider death counter
d difficulty level

How it works

1-8 set graphics, reset counter and score, set difficulty level
20-70 input and move man
80-190 move spiders relative to man's new position. Check if spiders reach man or fall into ponds
210-250 end of game routine
1000-1040 print field of play
1050-1090 dimension arrays, set man's start position to centre screen
1100-1120 print ponds
1130-1180 set up spider positions clear of man
1190 prints man in start position

Hints on conversion

ZX81 users could replace the user-defined graphics with available symbols, e.g. graphic A for the ponds etc., and use the DF.CC systems variable to detect the code of the chosen symbols in place of ATTR.

To help users of other BASICs the INK/PAPER colours are **0** black, **1** blue, **4** green, **5** cyan.

ATTR detects screen attributes at PRINT position (down, across). **32** green paper/black ink (man), **37** green paper/cyan ink (pond).

The key to the spider's tracking ability is contained in the logic in lines 110-140.

```
  1 DATA "a",60,126,127,255,254
,126,52,60,"b",16,56,146,124,56,
40,68,130,"c",66,165,189,165,153
,165,129,66
  2 FOR n=1 TO 3: READ a$: FOR
i=0 TO 7: READ a: POKE USR a$+i,
a: NEXT i: NEXT n
  5 LET s=0
  6 LET m=0
  8 PRINT TAB 3;"Difficulty le
vel (1 TO 3)": PAUSE 0: LET d=VA
L INKEY$: CLS
 10 GO TO 1000
 20 PRINT AT 21,10;"YOUR TURN";
PAUSE 50*(4-d)
  25 LET m$=INKEY$
  35 PRINT AT 21,10;"■■■■■■■■■■"
  40 PRINT AT p,q; INK 4;"■"
  50 LET p=p+(m$="6" AND p<20)-(
m$="7" AND p>1)
  60 LET q=q+(m$="8" AND q<30)-(
m$="5" AND q>1)
  65 IF ATTR (p,q)=37 OR ATTR (p,
q)=33 THEN GO TO 210
  68 LET s=s+1
  70 PRINT AT p,q; PAPER 4; INK
0;"B"
  80 FOR n=1 TO d*5+5
  90 IF y(n)=0 THEN GO TO 190
 100 PRINT AT y(n),x(n); INK 4;"
■"
 110 IF ABS (p-y(n))>ABS (q-x(n)
) THEN GO TO 140
 120 LET x(n)=x(n)-(x(n)>q)+(x(n
)<q)
 130 GO TO 150
 140 LET y(n)=y(n)-(y(n)>p)+(y(n
)<p)
 150 IF ATTR (y(n),x(n))=32 THEN
 GO TO 210
 160 IF ATTR (y(n),x(n))=37 THEN
 LET y(n)=0: LET #=#+1: IF #=d*5
+5 THEN GO TO 210
 170 IF y(n) THEN PRINT AT y(n),
x(n); PAPER 4; INK 1;"C"
 180 IF y(n)=p AND x(n)=q THEN G
O TO 210
 190 NEXT n
 200 GO TO 20
 210 PRINT AT p,q; INK 1; PAPER
4; FLASH 1;"B";AT 21,5; INK 0;"E
ND OF GAME   SCORE ";s
 240 PAUSE 200: CLS : PRINT AT 1
0,5;"PRESS Y TO PLAY AGAIN": PAU
SE 0: IF INKEY$="y" THEN GO TO 8
 250 STOP
1000 PRINT INK 0;"■■■■■■■■■■■■
■■■■■■■■■■"
1010 FOR n=1 TO 20
1020 PRINT "■"; INK 4;"■■■■■■■■
■■■■■■■■■■■■■■■■■■■■■■■■
```

sinclair special 3

Inside...
The New ZX Microdrive!
Latest software...
Latest prices...

The ZX Microdrive- and more!

For some time now, the new ZX Microdrive has been the subject of much discussion. Which is only to be expected, when the object of everyone's anticipation is *completely* new to the world of computing.

Microdrive provides high-speed access to truly massive storage. With just one Microdrive, you'll have at least 85K bytes of storage, and the ability to LOAD and SAVE in mere seconds. Yet the ZX Microdrive is about the size of a Spectrum mains adaptor, and costs less than £50!

First stocks are now in. Microdrives will be released on an order of priority basis. Spectrum owners who purchased by mail order, direct from us, will be sent full details including how to order, in a series of mailings that begins with the earliest names on our list.

And if you didn't buy by mail order?

Don't worry — for a colour brochure with full information on Microdrives, including how to order, just send us your name and address (use the coupon at the back of this issue of Sinclair Special). But remember, the sooner you send us your name, the sooner you'll get on the list.

Of course, there's much more to Sinclair than Microdrives, as you'll see on these pages. The latest releases of Spectrum and ZX81 software have been amongst the most successful ever. Prices of most established Sinclair products are at their lowest ever. To buy what you want, just use the Order Form.

Until the next issue of Sinclair Special, and more good news ...

Nigel Searle

Nigel Searle, Managing Director, Sinclair Research Ltd.

PS: Come and see us — and all that's new at Sinclair — at the PCW Show, Barbican Centre, from Sept 28th to Oct. 2nd. We'll be pleased to see you!

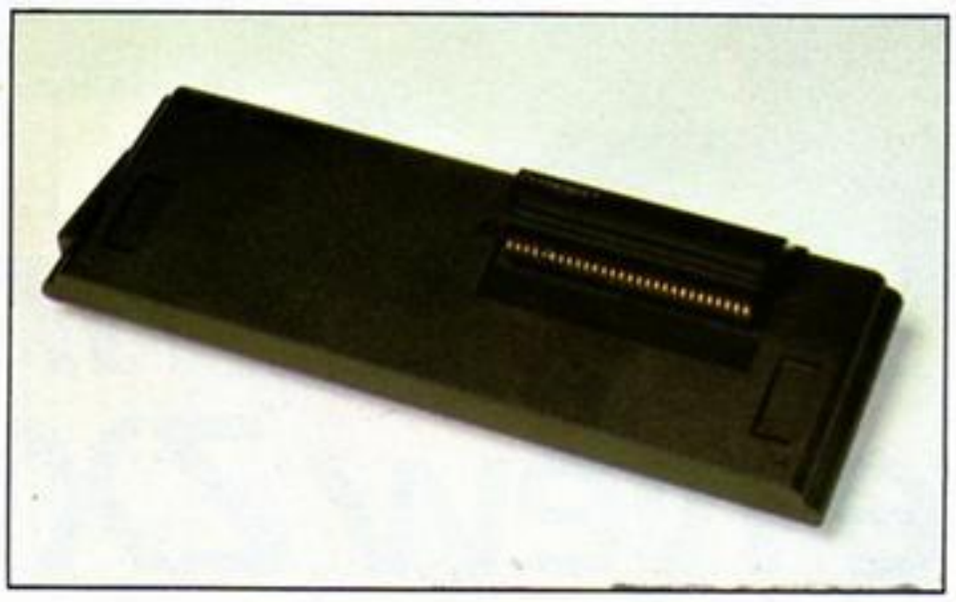
ZX Microdrive System preview!

ZX MICRODRIVE

At least 85K bytes storage, loads a typical 48K program in as little as 9 seconds: £49.95.

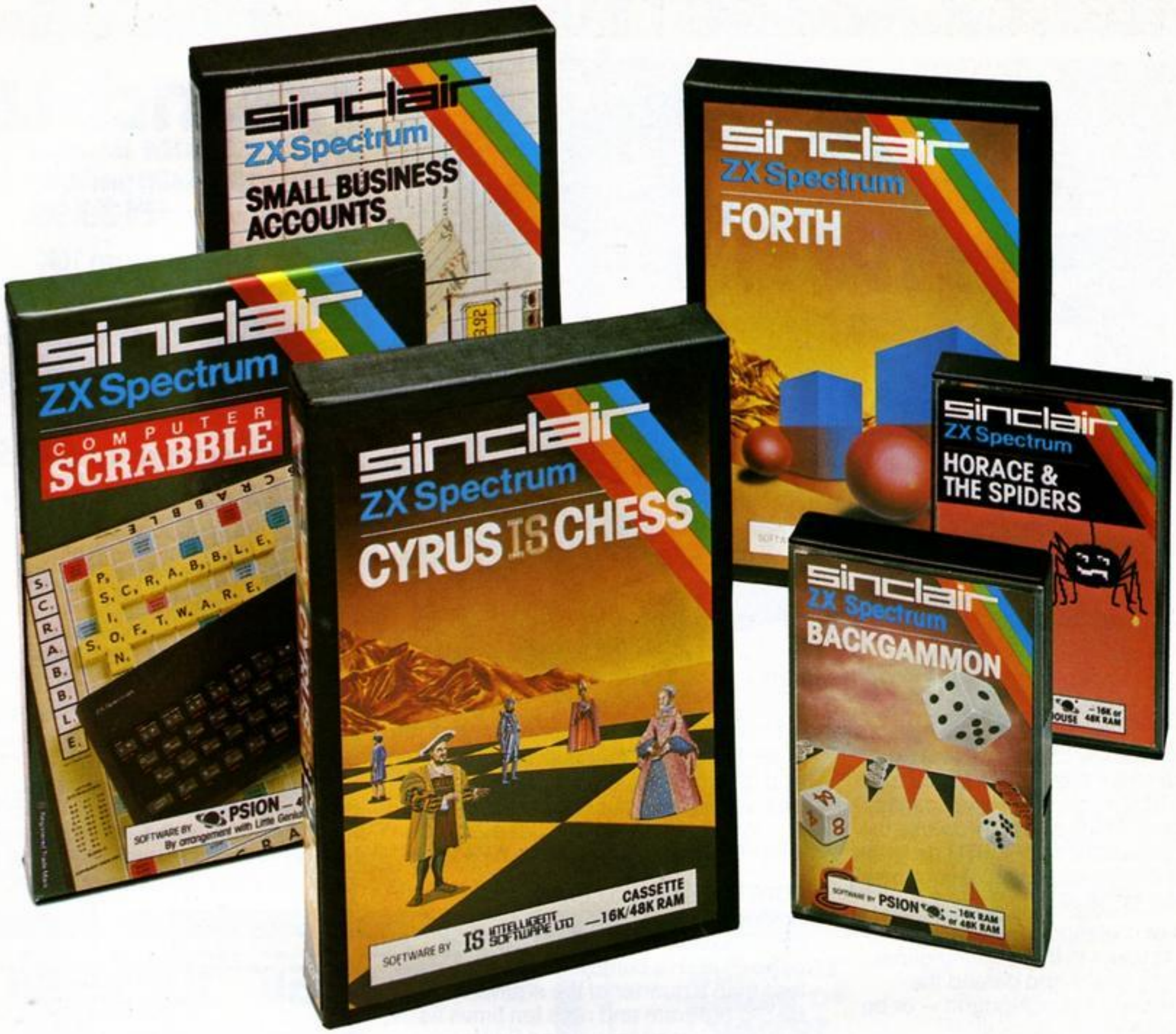
ZX MICRODRIVE CARTRIDGE

Compact, erasable, revolutionary. Complete with its own storage sleeve. Contains up to 50 files, with a typical access time of 3.5 seconds: £4.95.



ZX INTERFACE 1

Necessary for sending and receiving data from ZX Microdrive. Includes RS232 interface, enables creation of local area network of 2 to 64 Spectrums. Attaches to the underside of your Spectrum. Purchased with ZX Microdrive, just £29.95. As separate item, £49.95.



Six new ways to make more of your Spectrum

Take a look at these brand-new titles. Each is an outstanding new program using the full potential of the Spectrum, for games with stunningly animated graphics, for strategies of fiendish cunning, for masterly applications of computing capability...

Cyrus-IS-Chess Based on the Cyrus Program, which won the 2nd European Microcomputer Chess Championship *and* trounced the previously unbeaten Cray Blitz machine. With 8 playing levels, cursor piece-movement, replay and 'take-back' facilities, plus two-player option. The 48K version has many additional features including an extensive library of chess openings. For 16K or 48K RAM Spectrum.

Horace and the Spiders Make your way with Horace to the House of Spiders, armed only with a limited supply of anti-spider-bite serum. In the house, destroy the webs before the spiders can repair them. Then destroy the spiders, before *they* destroy Horace! Undoubtedly the creepiest Horace program ever produced! For 16K or 48K RAM Spectrum.

Computer Scrabble The famous board game, on-screen – with the whole board on view! A huge vocabulary of over 11,000 words. Full-size letter tiles, four skill levels – the highest of which is virtually unbeatable. For 1 to 4 players. For 48K RAM Spectrum.
(SCRABBLE trademark and copyright licensed by Scrabble Schutzrechte und Handels GmbH – a J.W. Spear and Sons PLC subsidiary.)

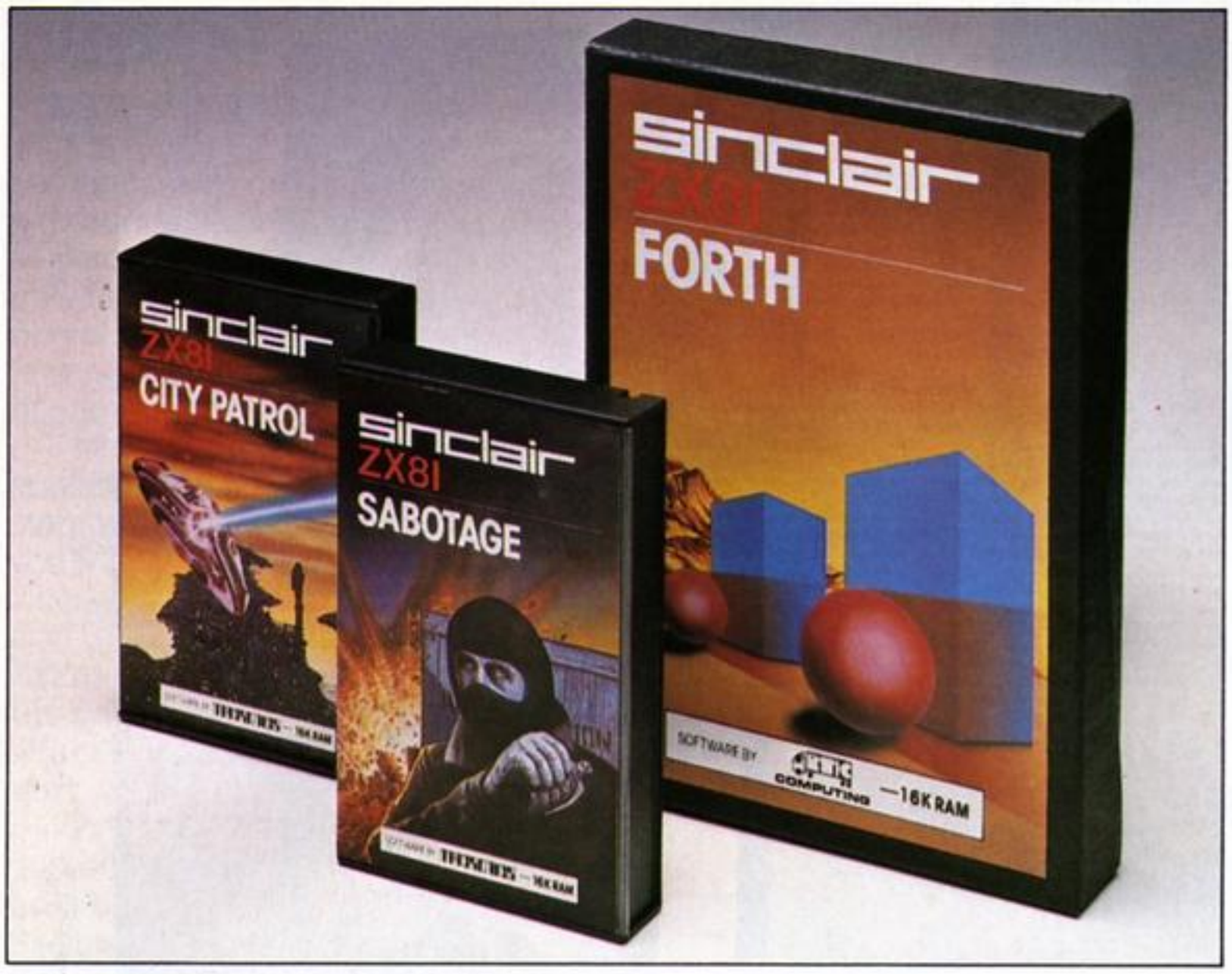
Backgammon A fast, exciting program, with traditional board display, rolling dice and doubling cube. Four skill levels. For experts – or beginners. (Rules are included – it's the quickest way to learn the game.) For 16K or 48K RAM Spectrum.

FORTH Learn a new programming language, as simple as BASIC, but with the speed of machine code. Complete with Editor and User manual. For 48K RAM Spectrum.

Small Business Accounts Speeds and simplifies accounting work, produces Balance Sheets, Profit and Loss information *and* VAT returns. Complete with User manual. For 48K RAM Spectrum.

Overleaf – your Sinclair order form.

Latest ZX81 software



These three new cassettes offer two totally different challenges to you and your ZX81. The games — like so many ZX81 games today — really do use the ZX81's capability. The FORTH program is a fascinating extension of your own computer understanding.

Sabotage. Defender or attacker? The choice is yours in this exciting game.

Be the guard and defend the ammunition in the compound — or be the Saboteur and attack it!

Written by Macronics for a ZX81 with 16K RAM. Cassette price: £4.95.

City Patrol. You are the Commander of a laser-firing ship. Your task is to intercept and destroy alien suicide ships descending on your city.

Written by Macronics for a ZX81 with 16K RAM. Cassette price: £4.95.

FORTH. Discover a new programming language which combines the simplicity of BASIC with the speed of machine code. FORTH's compiled code occupies less than a quarter of the equivalent BASIC program and runs ten times as fast. Free User-Manual and Editor Manual with each cassette.

Written by Artic for a ZX81 with 16K RAM. Cassette price: £14.95.

Prices round-up

ZX Spectrum 48K
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ZX Spectrum 16K
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ZX81 now just **£39.95.**

16K RAM Pack for ZX81
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1.2A ZX Mains Adaptor
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How to order

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	1.2A Mains Adaptor, for use with ZX81 computer/ZX Printer combination (only required if you have an early ZX81 with 0.7A Adaptor)	1002	7.95	
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			TOTAL £	

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	G24/S:Horace & the Spiders	4022	5.95	
	G25/S:Scrabble	4024	15.95	
	L1 /S:FORTH	4400	14.95	
	B6 /S:Small Business Accounts	4605	12.95	
	FOR ZX81			
	G25: Sabotage	2124	4.95	
	G24: City Patrol	2123	4.95	
	L1: FORTH	2400	14.95	
			TOTAL £	

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From silver screen to TV screen

These five programs take their themes from the cinema. Before buying, read our critics' reports

Raider of the Cursed Mine 48K Spectrum £5.50

Arcade, Technology House, 32 Chislehurst Road, Orpington, Kent BR6 0DG

The evil spirits that inhabit the cursed mine have been aroused by your desire to steal their diamonds. Beware of falling boulders, bats who steal points, spider's webs, and a ghost that has a nasty habit of materialising near to you.

There are three lifts, which take you up or down levels and provide you with complete safety. Extra lives can be gained by drinking life potions.

A bonus is given which varies with the length of time you took to steal all the diamonds, then you start a new level.

This interesting concept has all the makings of an excellent game, but the action is far too slow. Once you've got the hang of it, the game drags on interminably, because the difficulty remains the same. To make matters worse, after the score has reached about 36,000 it reverts to 0.

Understandably, Arcade are now bringing out an improved version with graded difficulty.

If you're hopeless at playing arcade-style games, then "Raider of the Cursed Mine" could be ideal. Otherwise, you'll master it so quickly in its present form that it will become boring. **S.E.**

instructions	70%
playability	35%
graphics	70%
value for money	57%

★ ★ ★

Escape-MCP VIC-20 £5.99

Rabbit, 380 Station Road, Harrow HA1 2DE

For some reason only one of the four copies of this game would load, unusual in a Rabbit program.

This is a maze game. Stop groaning, it's a good maze game, and original at that.

There is little doubt that the MCP refered to in the title is not Male Chauvinist Pig but Master Computer Program as in Tron.

The point of the game is to rush along a convoluted corridor pursued by a leggy M-shaped object (which cares little for walls).

It is difficult to keep out of the way of the opposition, but possible with skill and dexterity. Control is from joystick or keyboard, the latter proving more precise.

Different levels are achieved, with increasing difficulty, as walls are in part invisible in the higher levels.

This is a good game, with only a little music. I recommend it! **T.D.**

instructions	70%
playability	95%
graphics	80%
value for money	80%

★ ★ ★

Star Trek Commodore 64 £7.00

Interceptor Micros, Lidon House, The Green, Tadley, Hants

Star Trek is one of those old favourites which are always cropping up in varying formats. The usual plot is that you pilot a space ship and spend your time exploring the universe, killing Klingons and trying to gain promotion. The complexity of the game varies depending on the programmer.

As they go, this is a fair but not exceptional version. You are offered three different scenarios which offers a nice variety. The perceived complexity of the game was high with two "computer" options, detailed break-down of ships status and very detailed star maps.

The use of graphics was good and the star map quite neat with a cross hair cursor to help you study different star systems.

As play proceded I got the impression that the game wasn't as complex or enthralling as first impressions suggested. The combat routine wasn't particularly gripping. With the graphics capabilities of the 64, I had expected moving aliens, zapping lasers and a bit of fast real time action.

But overall, not a bad version of a good old standard, and at the price, a good buy. **A.W.**

instructions	100%
playability	90%
graphics	70%
value for money	70%

★ ★ ★ ★

Hummer House of Horror Spectrum 48K £7

Lasersound, Stratford Workshops, Burford Road, London E15

This is a typical haunted-house adventure game in which you have to traverse 60 rooms on four floors to reach a maiden with an hour to live.

The display is a sequence of 3D rooms, all the same except for the number of doors and the occasional staircase.

Labels show the room's inhabitant and items to pick up, and the name of the room and the progress of the chance encounters appear as text in a panel at the bottom.

Text messages tell you the results of your input and, then, perhaps, the room changes. A nice touch is a one-hour clock in a corner of the display.

I found both copies very difficult to load and the system of matching strings to give instructions is slow and error prone.

The repeated display becomes very dull and you are invited to keep a note of your strength, which drops with moves and goes up or down with encounters. Why not display it? This is a pretty ordinary game. **H.C.**

instructions	60%
playability	40%
graphics	60%
value for money	60%

★ ★ ★

Battlestar Attack TI-99/4A (Extended basic) plus Joystick £10.00

Lantern Software, 4 Haffenden Road, Tenterden TN30 6QD

Fans of Star Wars will need no introduction to the theme of Battlestar Attack.

Your mission is to destroy the battlestar which threatens your home planet. Its destruction is accomplished by firing at the exhaust port five times.

The battlestar, however, is surrounded by mines which will damage your shields unless they are disposed of first.

If you successfully wipe out one battlestar the game begins again as another of a whole fleet appears.

The action is fast and becomes more furious as skill levels are increased from 1 to 4. Even at level one, a very addictive game. **J.W.**

instructions	100%
playability	90%
graphics	90%
value for money	75%

★ ★ ★ ★ ★

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Spectrum I/O port single wire (Breadboard) compatible and/or edge card connection to 24 latched I/O lines, £13.85. Control IC's, Books, Hardware. SAE for lists. Multitron, Dept. HCW, 5 Milton Close, Redditch B97 5BQ.

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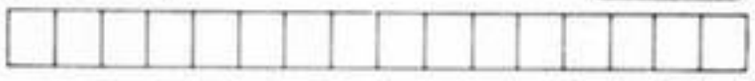

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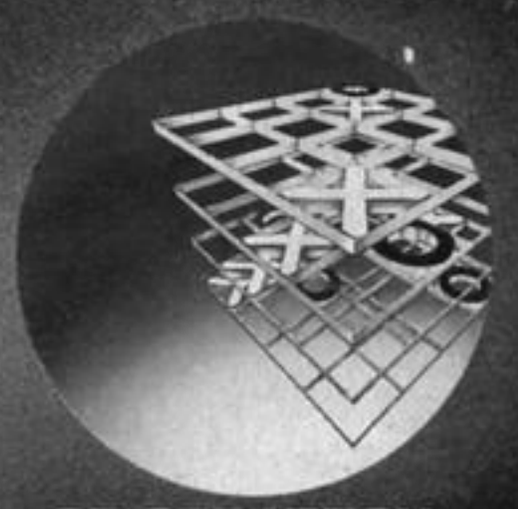

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